

Technical Proposal
Regional study on
Global Environmental Issues
Volume 2: Appendix VI
(India Country Team)

Submitted to
The Asian Development Bank

By the
Tata Energy Research Institute, New Delhi
Centre for International Climate & Energy Research, Oslo
and Associates

February 1992

INDIA COUNTRY STUDY TEAM

The Tata Energy Research Institute will act as the domestic consultant for the India Country Study in addition to its role in the association of international consultants. The background and experience of TERI are detailed in the main technical bid document. The Local Resource Persons team for India is constituted from the professional staff of TERI. The team is headed by Dr. Ligia M. Noronha, and comprises a number of specialists in the fields of resource economics, impact assessment, and strategy choice.

The India Country Study team includes the following

- 1/ Dr. L.M. Noronha : Team Leader/Resource Economist .
- 2/ Dr. R.K. Pachauri : Strategy Specialist
- 3/ Dr. T.N. Khosloo : Strategy Specialist
- 4/ Dr. P. Ghosh : Strategy Specialist
- 5/ Dr. R.R. Nangia : Resource Economist
- 6/ Dr. S.K. Sinha : Impact Specialist
- 7/ Dr. Y.P. Abrol : Impact Specialist
- 8/ Dr. V. Jagannathan : Impact Specialist
- 9/ Ms. A.N. Achanta : Impact Specialist
- 10/ Dr. N. Ratnakar : Impact Specialist
- 11/ Mr. A. Kansal : Impact Specialist
- 12/ Dr. P.V. Dehadrai : Impact Specialist
- 13/ Dr. R.S. Varshney : Impact Specialist
- 14/ Dr. V.M. Pattarkine : Impact Specialist
- 15/ Dr. S.P. Banerjee : Impact Specialist

- ✓16/ Mr. O.N. Kaul : Impact Specialist
- 17/ Mr. V.K. Koul : Impact Specialist
- 18/ Dr. V.V.N. Kishore : Strategy Specialist
- 19/ Dr. K.B. Pandey : Strategy Specialist
- 20/ Dr. A. Mathur : Strategy Specialist
- 21/ Dr. D. Luthra : Strategy Specialist
- ✓22/ Dr. C.S. Sinha : Strategy Specialist
- 23/ Ms. K.N. Dassani : Strategy Specialist
- 24/ Mr. G. Chandrashekhar : Strategy Specialist
- 25/ Ms. L. Srivastava : Resource Economist
- 26/ Ms. M. Mehra : Resource Economist
- 27/ Mr. V. Suri : Resource Economist
- 28/ Mr. G. Sethi : Resource Economist
- 29/ Mr. H.S. Datta : Resource Economist
- 30/ Ms. N. Khanna : Resource Economist
- 31/ Ms. Anna Roy : Resource Economist
- ✓32/ Ms. P. Bhandari: Resource Economist
Details are furnished below. (The major work undertaken and present deployment schedule are given with the IRP team.)

BIODATA

1. PROPOSED POSITION : Team Leader/Resource Economist

2. NAME : Maria Ligia Noronha

3. DATE OF BIRTH : 12 November, 1957

4. NATIONALITY : Indian

5. EDUCATION : (1) Ph.D (Econ) 1988
(The years in which various qualifications are obtained must be stated)
London School of Economics.
(ii) M.Sc. (Econ) (Sea Use Law, Economics and Policy) 1984
London School of Economics
(iii) M.A. (Econ/Sociology) 1980
(Bombay University)

6. OTHER TRAINING : (1) Attended the International Oil & Gas Summer School organized by Erasmus University, Rotterdam + London School of Economics in 1987 (May).
(ii) Involved with the International Resources Programme, LSE, 1986/87.

7. LANGUAGE & DEGREE OF PROFICIENCY : (1) English: Read, write, speak fluently
(ii) Portuguese: Read and speak fluently.
(iii) French: Speak and read a little.

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : International Geographical Union.

9. COUNTRIES OF WORK EXPERIENCE : (1) India
(ii) United Kingdom

10. EMPLOYMENT RECORD :
(i) From 4/88 To present.

Employer. Tata Energy Research Institute

Position held Fellow

Description of duties Work on oil/gas and environmental interface economic impacts of global warming, especially of sea level rise, environmental costing of energy is present.

(ii) From: 10/84 To: 6/86

Employer: London School of Economics

Position held: Tutor in (a) Resource Economics
(b) Policy-making for sea use.

(iii) From: 6/81 To: 9/83

Employer: Sophia College, Bombay

Position held: Lecturer in Economics.

(iv) From: 6/80 To: 6/81

Employer: Carmel College, Goa

Position held: Lecturer in Economics.

(v) From: 12/78 To: 10/79

Employer: State Bank of India

Position held: Clerical.

11. DETAILED TASKS ASSIGNED

- 1) Plan and coordinate the activities of the India team.
- 2) Costing of Policy Options
- 3) Work on National Response Strategy

12. CERTIFICATION

Work undertaken

- 1. Plan and co-ordinate the activities of the Global Warming Centre at TERI.
- 2.1 Work on Sea Level Rise, Marine Environments & Hydrocarbon Activity (Jan-May 1990)
- 2.2 Research on the Incorporation of Natural Resource Accounts into National Income Accounts (Nov 1990 ongoing).
- 3.1 Ph.D work on Indian Oil Policy.

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

K. N. S. J. Iyer

DATE OF SIGNING . 27 01 1992
DAY MONTH YEAR

6. President (1988), International Association for Energy Economics (IAEE), Washington, D.C.
7. Member, American Economic Association.
8. Member, Honor Society of Phi Kappa Phi.
9. Technical Chairman, Workshop on Microcomputer Software Applications for Energy Planning in Developing Countries held under the auspices of Department of Technical Cooperation for Development (DTCD), United Nations, New York, from 9 - 13 September 1985.
10. Member, Task Force on Energy Planning and Modelling, United Nations University, Tokyo - 1982.
11. Founding Member & Past Chairman (1980-83), Coordinating Committee, Cooperative International Network for Training & Research in Energy Planning (Secretariat: UNESCO, Paris) - 1980-1987.

9. COUNTRIES OF WORK EXPERIENCE : India, U.S.A., Canada

10. EMPLOYMENT RECORD :
From April 1981 to date
Working as Director at Tata Energy Research Institute, New Delhi, India
From June 6th to September 5th 1990
Worked as Visiting Research Fellow, The World Bank, Washington D.C.

From May 1982 to June 1982

Worked as Senior Visiting Fellow, Resource Systems Institute, East-West Center, Honolulu, USA

From August 1981 to August 1982

Worked as Visiting Professor, Resource Economics, College of Mineral and Energy Resources, West Virginia University, Morgantown, West Virginia, USA

From July 1979 to March 1981

Worked as Director, Consulting and Applied Research Division, Administrative Staff College of India, Bella Vista, Hyderabad, India

From June 1975 to June 1979

Worked as Member, Senior Faculty, Administrative Staff College of India, Bella Vista, Hyderabad, India

From Summer 1976 and Summer 1977

Worked as Visiting Faculty Member, Department of Economics and Business, North Carolina State University, Raleigh, North Carolina, USA

From August 1974 to May 1975

Worked as Assistant Professor, Department of Economics and Business, North Carolina State University, Raleigh, North Carolina, USA

From August 1968 to August 1971

Worked as Works Manager (Engine Division), Diesel Locomotive Works, Varanasi, India

From November 1967 to April 1968

Worked on deputation from Government of India to Montreal Locomotive Works, Montreal, Canada

From August 1965 to November 1967

Worked as Asstt. Works Manager, Diesel Locomotive Works, Varanasi, India and other managerial positions

DETAILED TASK ASSIGNED : RELATED WORK EXPERIENCE

1. Plan/Coordinate and assist in the overall development and working on all parts of the project.

Have been in the energy field for almost twenty years. During this period, I have executed or supervised several hundreds of projects in the energy and environment field. An indication of this is provided by the small sample of my publications listed in attached list.

CERTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience, I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

Unikumar

SIGNATURE :

DATE OF SIGNING : 27 / 1 / 1992
Day Month Year

LIST

PUBLICATIONS

Books

1. Workshop Proceedings of the Asian Energy Institute, Global Warming: Mitigation Strategies and Perspectives from Asia and Brazil, R.K. Pachauri & Abhilasha Behl (eds), Tata McGraw Hill Publishing Co Ltd, New Delhi, 1991.
2. Proceedings of the Conference on the Role of Innovative Technologies and Approaches for India's Power Sector, Leena Srivastava & R.K. Pachauri (eds), Tata McGraw Hill Publishing Co Ltd, New Delhi, 1991.
3. Proceedings of the Twelfth International Conference of the International Association for Energy Economics : Energy-Environment-Development, R.K. Pachauri, Leena Srivastava & Kapil Thukral (eds), Vikas Publishers, New Delhi 1991.
4. Proceedings of the International Conference on Global Warming and Climate Change : Perspectives from Developing Countries, Sujata Gupta & R.K. Pachauri (eds), Tata Energy Research Institute, New Delhi 1990
5. Energy Policy Issues : Household Energy Vol. 4, 1988, R.K. Pachauri & Leena Srivastava (eds), Tata Energy Research Institute, New Delhi 1989
6. Energy Policy Issues - Higher Energy Efficiency Vol. 3, R.K. Pachauri & G. Sambasivan (eds) Wiley Eastern Limited, India, 1987.
7. Global Energy Interactions, Allied Publishers, New Delhi, 1986.
8. Energy Policy Issues, R.K. Pachauri & Leena Srivastava (eds), Wiley Eastern Limited, New Delhi, 1986.
9. Energy Policy Issues, R.K. Pachauri & K. Thukral (eds), Allied Publishers, New Delhi 1985.
10. The Political Economy of Global Energy, Johns Hopkins University Press, Baltimore, 1985.
11. National Energy Data Systems, edited by D.R. Ahuja, R.K. Pachauri & N.K. Gopalakrishnan, Concept Publishers, New Delhi, 1984.
12. International Energy Studies, Wiley-Eastern, New Delhi and John Wiley and Sons, New York, 1980.
13. Energy Policy for India: An Inter-disciplinary Analysis, Macmillan Company of India, New Delhi, 1980.

14. **Energy and Economic Development in India**, Praeger Publishers, New York, 1977.
15. **The Dynamics of Electrical Energy Supply and Demand: An Economic Analysis**, Praeger Publishers, New York, 1975.

Selected Papers

1. Can Hydro-reservoirs in tropical moist forest be made environmentally acceptable? a report to the Environment Dept., World Bank, alongwith Robert Goodland and Anastacio Juras, Aug 1991.
2. Pachauri R.K., Energy Efficiency and Conservation in India, UNEP Industry and Environment, 13, 2, April-June 1990, 19-24.
3. Pachauri, R.K., Energy Efficiency in Developing Countries: Policy Options and the Poverty Dilemma, Natural Resources Forum, 14, 4, Nov 1990, 319-325.
4. Pachauri, R.K. and Suri, V. Contribution to greenhouse gases through large scale use of fossil fuels and bio-fuels. Energy Environment Monitor 6,1, March 1990, 11-16.
5. Energy Conservation by R.K. Pachauri & G. Sambasivan, in Infoterra Exchange of Environmental Experience Series - Book Two, 1989, UNEP, Nairobi.
6. Pachauri, R.K., "Energy and Growth: Beyond the Myths and Myopia", Presidential Address at the 10th Annual International Conference of the IAEE, 4-7th July, 1988, "The Energy Journal", 1989
7. Pachauri, R.K., and Srivastava, Leena, "Integrated Energy Planning in India: A Modeling Approach", The Energy Journal, Volume No. 9, No. 4, 1988.
8. Pachauri, R.K., "Energy et croissance: au-delà des mythes et des myopies", Allocution de synthèse à la 10^e Conférence Internationale de l'IAEE (Luxembourg, juillet 1988), Revue de l'énergie, Septembre, 1988.
9. Pachauri, R.K., "Fossil Fuel Use, Society and the Environment", in Perspectives in Environmental Management, edited by T.N. Khoshoo, Oxford and IBH Publishers, 1987, pp. 353-360.
10. Pachauri, R.K., "Standard Setting", in Economics of Environment, edited by Malcolm S. Adisheshiah, India International Centre, 1987.
11. Pachauri, R.K., "The Present Situation of and Future Prospects for Energy Development in the Developing

Countries", VIIth New Energy Industrial Symposium, Tokyo, October 21-23, 1986.

Pachauri, R.K., "Energy Economy Interactions in the Countries of South Asia: Regional Issues and Challenges", World Energy Conference, Cannes, France, October 5-11, 1986.

Pachauri, R.K. and Srivastava, Leena, "The Changing Structure of the Oil Industry in India", Energy (Pergamon), April/May (Nos. 4/5), 1986.

"Coal Transportation System Modelling - The Case of Taiwan: A Comment," with Leena Srivastava, The Energy Journal, Vol. 6, No. 3, July 1985.

"Third World Energy Policies: The Urban-Rural Divide," Energy Policy, Vol. 11, No. 3., September 1983.

"Coal: A Development Challenge," with Walter C. Labys and Charles L. Blitzer, Natural Resources Forum, Vol. 7, No. 4, 1983.

"Changing Markets for Coal," with Walter C. Labys, in International Energy Markets, edited by L.P. Tempest, Oelgeschlager, Gunn & Hain, Cambridge, Mass., 1983.

"Financing the Energy Needs of the Developing Countries," In Annual Review of Energy, Vol. 7, Editors Jack M. Hollander, Harvey Brooks, Melvin K. Simmons, 1982.

"The Role of Electric Power in Economic Development: The Case of India," Energy Policy, September 1982.

"Energy Demand and Supply Projections for India," Discussion Paper, Center for Energy Policy Research, Resources for the Future, Washington, DC, 1982.

"Financing Energy Developments in the Third World", in International Energy Options: An Agenda for the 1980's, editor Paul Tempest, Oelgeschlager, Gunn and Hain, Cambridge, Mass., 1981

"Energy Problems and Prospects in the Third World," Bulletin of the Organisation for Arab Petroleum Exporting Countries, June 1980.

"Energy Demand Forecasting and Supply Problems," in Commerce, Annual Number, India, 1978.

"The Economics of Occupational Health and Safety," the Journal of Safety Research, Volume 10/Number 2, Summer 1978.

"The Management of Corporate Cash Balances: An Analytical Approach," ASCI Journal of Management, September 1976.

"A Dynamic Regional Analysis of Factors Affecting the Electrical Energy Sector in the US," in Energy, Regional Science and Public Policy, editors P. van Rompuy and M. Chatterji, Springer-Verlag, New York, 1976

"A Dynamic Model for Forecasting Electrical Energy Demand in a Specific Region Located in North and South Carolina," Proceedings of Sixth Annual Simulation and Modelling Conference, Pittsburgh, 1975.

opular/Newspaper Articles

"Energising Indian Economy", centre page, Hindustan Times, September 11, 1991.

"Global Warming : A Look at Reality", centre page, The Times of India, 29 May, 1991.

Energy Sector reflects distorted policies, Business and Political Observer, February 19, 1991.

"Petroleum Challenge: India's Options and responses", Business and Political Observer, Jan 2, 1991.

"How China copes with pollution", centre page, Hindustan Times on December 27 & 28, 1990.

"Workable Energy Policy", centre page, Hindustan Times on November 14, 1990.

Energy Scenario : Global vis-a-vis National, Financial Express, October 10, 1990.

"The Sin of Cynicism", centre page, Hindustan Times on July 13, 1990.

"Environment : Lopsided Priorities", centre page, Hindustan Times on June 5, 1990.

- "Planet Fund : Polluter Must Pay", centre page, The Hindustan Times on October 16th, 1989
- "Ozone Depletion : Soft Options Won't Do", centre page, The Hindustan Times on June 22, 1989.
- "Oil Politics in Gulf", centre page, The Hindustan Times, dated July 6, 1988.
- "Emerging Edifice of India", centre page, The Hindustan Times, dated 30.3.88.

"Over-use and Abuse of Resources", centre page, The Times of India, dated 1.10.87.

"Pakistan's Bomb : Need to Shift Oil Imports", centre page, The Hindustan Times, dated 9.5.87.

"Bottom upwards approach to Indian Energy Problem", Times of India, New Delhi, June 1986.

Lect Conference Presentations:

Study on mitigating measures to be adopted by developing countries for countering the greenhouse effect, alongwith L. Noronha, K. Nagpal & S. Gupta at the AEI Workshop on Developing Countries Perspectives for Protecting the Global Commons, Bellagio Study Centre, Italy, Nov 26-30, 1990.

"Major Energy Issues of the Developing World" Presented at World Energy Council Forum, "Energy Perspectives for the 90s", Harare, November 12-14, 1990.

"Energy Planning and the Market Mechanism", an Invited Address to the Bergen Energy Conference on "Market Based Energy Planning for Developing Countries", August 23-24, 1990, Bergen, Norway.

"High Capital Productivity in the Power Sector: Issues and Challenges for India" with Leena Srivastava and Sujata Gupta, presented at the PACER Conference : Role of Innovative Technologies and Approaches for India's Power Sector, , New Delhi, India, 24-26 April 1990.

"Energy Efficiency in Developing Countries: Policy Options and the Poverty Dilemma", paper presented at the RIIA/BIEE/IAEE Fourth International Energy Conference on "Environmental Challenges: The Energy Response", London, UK, December 4-5, 1989.

• "Energy, Economic Development and the Environment", paper presented at the IFAC/IFORS/IAEE International Symposium on Energy Systems, Management and Economics (ESME '89), Tokyo, Japan, October 25-27, 1989.

• Statement at Workshop on "Industrial Metabolism: Restructuring for Sustainable Development", Maastricht, The Netherlands, October 12-13, 1989.

• "Energy, Environment and Sustainable Development", U.N. Seminar on Energy and Conservation in Developing Countries, Stockholm, Sweden, September 3-9, 1989.

"Environmental Concerns and Sustainable Development", Workshop on Sustainable Development, sponsored by Ministry of Environment and Forests Bombay, India, September 4-6, 1989.

"Stretching Our Breathing Space: View from India", International Workshop on "A Little Breathing Space: Carbon Dioxide Emission Reduction Strategies", Budapest, Hungary, April 14-15, 1989.

"Fossil Fuel Use Trends and Projections: An Agenda for Action in the Developed Countries" with T.C.A. Vijayendra V., and Kajoli Banerjee, International Conference on "Global Warming and Climate Change: Perspectives from Developing Countries", New Delhi, February 21-23, 1989.

"Towards an Asian Identity in Energy Trade and Development", paper presented at the Asian and Pacific Conference on "Energy and Economic Development", Taipei, Nov. 7, 1988.

"The Economics of Environmental Policy and Control: Energy Use and the Transport Sector", paper presented at the workshop on "Environmental Aspects in Railway Development", 1988.

· "Energy and Growth: Beyond the Myths and Myopia", presented at the 10th Annual International Conference of the IAEE at Luxembourg on 4-7, July, 1988.

· "Global Warming: Perspectives on India's Energy Policies and Responses to Climate Change", paper presented at Workshop on "Responding to the Threat of Global Warming: Options for the Pacific and Asia", Honolulu, Hawaii, U.S.A., June 21-27, 1988.

· "The Economics of Energy Conservation in Developing Countries", paper presented at Conference on "Energy Efficiency Strategies for Thailand: The Needs and Benefits", Pattaya, Thailand, March 4-6, 1988.

· "Changing Structure and Performance of the Energy Sector" - Presented at the 1987 APO/RSI Seminar on Energy Sector Performance and Economic Development in Asia, Bangkok, Thailand, August 3-7, 1987.

· "The Outlook for Science & Technology in India at the turn of the century : Energy" - talk delivered at XII Indian Social Congress, Mysore, July 1987.

· "Producer-Consumer Relations in Unstable Oil Markets" - Presented at the Session on the Ninth International Conference of the International Association of Energy Economists, Calgary, Alberta, Canada, July 6-8, 1987

"Depletion of Forest Resources - Cost and Consequences" - paper presented at the International Workshop on Agroforestry for Rural Needs, New Delhi, February 22 - 26, 1987.

"Alternative Sources of Energy", Talk delivered at the 6th International Exhibition and Conference for Oil, Gas, Energy, Chemical Processing Instrumentation and Engineering Industries, Chemtech Secretariat, Feb. 87.

"Energy-Economy Interactions in South Asia: Regional Issues & Challenges" - presented at the 13th World Energy Conference held at Cannes, France from 5- 11 Oct. 1986.

"Role of Energy Models in Planning in India", prepared by Dr. R.K. Pachauri & Mrs. Leena Srivastava for presentation at the Eighth Annual International Conference of the IAEE, held at Tokyo, June 5-7, 1986.

"Energy Employment and Rural Development in Mountain Areas of India" - presented at the preparatory meeting on Indian Contribution to International Workshop on Rural Energy Issues in the Hindu Kush-Himalaya organised by the International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal, January 1986.

"Rational Energy Use in Asia" - paper presented at Special Workshop on Rational Use of Energy - an End-Use Oriented Strategy", Sao Paulo, Brazil, November, 1985, organised by Department of Technical Cooperation, United Nations.

"Utilisation of Microcomputers for National Energy Data Systems - Institutional Implications" - presented at the UN - DTCD Workshop, New York, September, 1985.

"Energy in the Developing Countries: A Classification of Problems and their Global Impacts" - presented at the International Conference of the International Association of Energy Economists, Bonn, June 1985.

"Industrial Growth & Stagnation: The Energy Connection" - invited paper presented at Silver Jubilee Seminar, Institute of Economic Growth, Delhi, 1984.

"Growth of Electric Power in the Indian Economy" - invited paper presented at the 6th Workshop of the Asia Pacific Energy Studies Consortium, Honolulu, May 1983.

"Changing Markets for Coal in the Developing Countries" - invited paper presented at International meeting of International Association of Energy Economists at Cambridge, UK, June 28-30, 1982.

31. "Transition in Fuel Use: Issues and Prospects" - paper presented at 5th Workshop of the Asia Pacific Energy Studies Consortium, Honolulu, May 17-21, 1982.
32. "Energy Planning and Modelling" - paper presented at the first meeting of the UN University Task Force at Bariloche, Argentina, April 5-8, 1982.
33. "Approach to Planning for Biomass Energy Resources" - presentation made at International symposium on "Evaluation of Energy Resources and Needs in the Third World" at Dakar, Senegal, April 1-2, 1982.
34. "Energy Prospects in the Developing Countries: Some Global Implications" - paper presented at the annual North American Conference of the International Association of Energy Economists, Houston, Texas, November 1981.
35. "Survey of Energy Conservation in India: Priorities and Policy Dimensions" - paper presented at 4th Workshop of the Asia Pacific Energy Studies Consortium, Honolulu, June 1981.
36. "The Geopolitics of Energy and Its Global Implications" - paper presented at International Scientific Forum on Energy, Fort Lauderdale, Florida, November 1980.
37. "Financing Energy Developments in the Third World" - paper presented at International Conference of the International Association of Energy Economists, Cambridge, UK, June 1980
38. "Energy Problems and Prospects in the Third World" - paper presented at the International Science Forum on Energy, Nice, France, October 1979.
39. "Technological Alternatives in the Face of the Energy Crisis" - National Seminar on Energy, Bombay, India, January 1978.
40. "Energy and Development in the Third World" - paper presented at the International Conference on Energy Use Management, Tucson, Arizona, October 1977.
41. "Petroleum for India: A Future Perspective", - paper presented at National Workshop on Management of the Future, Hyderabad, October 1976.
42. "An Economic Evaluation Index for the Performance of Multinational Corporations Operating in India", - paper presented at the Conference on Management Research, Ahmedabad, 1975.

Sample List of Research Assignments and Reports:

Development of a demand forecasting model for the service region of the Salt River Project (a public owned utility), Phoenix, Arizona - 1977 to 1982.

Forecasting demand for natural gas in the region served by Southern California Power & Gas Co., 1982.

Conservation possibilities and interfuel substitution in India's manufacturing industries - for Resources for the Future, Washington, DC (1982).

Designed and supervised a study on "Social Cost-Benefit Analysis of Rural Electrification" - for Resources for the Future, Washington, DC (1981).

Models for electricity demand for the industrial sector in India - funded by the Planning Commission, Government of India (1981).

Statistical Models for Evaluation of Oil Projects - funded by the Institute of Petroleum Exploration, Dehra Dun, India (1980).

Investment Decisions and Project Appraisal for Oil and Natural Gas Production - funded by Institute of Petroleum Exploration, Dehra Dun, India (1980).

Development of a methodology for forecasting electricity demand in western India - funded by Western Regional Electricity Board (1979).

Development of a dynamic forecasting model for electricity demand for the state of Andhra Pradesh - funded by the Ministry of Energy, Government of India (1976-77).

Development of a forecasting model for electricity demand in the region served by Carolina Power and Light Company - funded by Carolina Power and Light Company, Raleigh, NC (1973).

Development of an electricity demand forecasting model for the region served by the Salt River Project, Phoenix, Arizona, (1977-82).

BIODATA

1. PROPOSED POSITION : Policy Analyst

2. NAME : Triloki Nath Khoshoo

3. DATE OF BIRTH : April 7, 1927

4. NATIONALITY : Indian

5. EDUCATION : (i) Ph.D.
Punjab University, Chandigarh
(ii) M.Sc. Hon. School (Botany)
Punjab University, Lahore
(iii) B.Sc. Hons. School (Botany)
Punjab University, Lahore

6. OTHER TRAINING :

7. LANGUAGE & DEGREE OF PROFICIENCY :

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Indian National Science Academy (Fellow), New Delhi.
(ii) Indian Academy of Science (Fellow)
(iii) National Academy of Sciences-India (Fellow)
(iv) Institution of Engineers (Fellow)
(v) Indian Society of Genetics and Plant Breeding (Fellow)
(vi) Indian Botanical Society (Fellow)
(vii) Indian Academy of Agricultural Sciences.

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :
(i) From: 1991 To: present
Jawaharlal Nehru Fellow

(ii) From: 1985 To: 1990
Employer: Council of Scientific & Industrial Research, New Delhi
Post held: Distinguished Scientist

(iii) From: 1982 To: 1985
Employer: Department of Environment, Govt. of India

Post held: Secretary

(iv) From: 1976 To: 1982
Employer: National Botanical Research Institute, (CSIR), Lucknow

Post held: Director

v) From: 1974 To: 1976
Employer. National Botanic Garden, (CSIR), Lucknow

Post held: Deputy Director

vi) From 1964 To: 1974
Employer. National Botanic Garden, (CSIR), Lucknow

Post held: Assistant Director

vii) From. 1962 To: 1964
Employer J&K University, Srinagar

Post held Head, Post Graduate Dept. of Botany

viii) From 1948 To: 1962
Employer: Punjab University

Post held: Senior Lecturer

1. DETAILED TASKS ASSIGNED : Policy Analyst
(List of tasks one by one and support each task by project experience on the right hand side) : (List project name, location, year, position held, i.e. Team Leader, Hydrologist, Agricultural Economist, etc. exact duties rendered and time spent on each project)

2. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : *T. M. Khanvilkar*
DATE OF SIGNING : 31 / 1 / 1992
DAY MONTH YEAR

**CURRICULUM VITAE OF
DR T N KHOSHOO**

Name :

- Dr. Triloki Nath Khoshoo

Date of Birth :

- April 7, 1927 at Srinagar, Kashmir (India)

Address :

- Tata Energy Research Institute
9 Jor Bagh
New Delhi - 110 003 (India)

Education :

- Ph.D.
Punjab University, Chandigarh
- M.Sc. Hon. School (Botany)
Punjab University, Lahore
- B.Sc. Hons. School (Botany)
Punjab University, Lahore

Positions Held :

- 1991- Jawaharlal Nehru Fellow
- 1985-90 Distinguished Scientist
Council of Scientific & Industrial
Research, New Delhi.
- 1982-85 Secretary to the Government of India
Department of Environment
New Delhi
- 1976-82 Director, National Botanical Research
Institute, (CSIR), Lucknow.
- 1974-76 Deputy Director, National Botanic
Garden (CSIR), Lucknow
- 1964-74 Assistant Director, National Batanic
Garden (CSIR), Lucknow
- 1962-64 Head, Post Graduate Department of
Botany, J&K University, Srinagar
- 1948-62 Senior Lecturer, Punjab University
Chandigarh

Honours/Awards :

- Prince of Wales Gold Medal of Punjab University, Lahore (1942)
- Rafi Ahmad Kidwai Medal and Prize of the Indian Council of Agricultural Research, New Delhi for outstanding work on non-agricultural economic plants (1977)
- Birbal Sahni Gold Medal of the Indian Botanical Society for outstanding work in plant sciences (1982)
- Seth Memorial Medal of the Indian Society of Tree Scientists for outstanding work on forest trees, in particular conifers (1983)
- Ramdeo Misra Medal of the Indian Environmental Society for the valuable contributions relating to environmental sciences (1984)
- Dayawati Vira Medal of agri-horticulture Society for outstanding work in beautifying the environment (1985).
- Sanjay Gandhi Award for outstanding work in Environment and Ecology, and services rendered to the country in these areas (1986)
- Distinguished Service Award of the Indian Science Congress (1988)
- Distinguished Service Award of the Indian Society of Genetics and Plant Breeding (1991)
- Guru Prashad Chatterjee Lecture Award, Indian National Science Academy, 1985
- Om Prakash Bhasin Foundation Award in Agriculture (Biomass Production, Processing and Utilization) (1989)
- Guru Prashad Chatterjee Lecture Award in Agriculture (Biomass Production, Processing and Utilization) (1989)
- National Lecturer of the University Grants Commission, New Delhi (1981)
- Past President, Botany Section, Indian Science Congress association, Calcutta (1982)
- Past General President, Indian Science Congress Association - 73rd Session (1985-86)

- Past President, Bio-energy Society of India (1985-86)
- Past President, National Academy of Sciences India.
- Past President, Indian Society of Genetics and Plant Breeding, (1986)
- Past President, Indian Society of Tree Scientists (1988-1991)
- Past Co-Editor, Silvae Genetica, International Journal of Forest Genetics and Tree Breeding, West Germany (1960-84)
- Member, Editorial Board, Plant Systematics and Evolution. Springer Verlag, Vienna and New York
- Past Deputy Chairman, Working Group on Cytogenetics, International Union of Forestry Research Organization, Washington
- Vice-Chairman, Governing Council, United Nations Environment Programme, Nairobi (198
- Past National Chairman, International Union of Biological Sciences (1981-84)
- Member Scientific Advisory Committee to the Cabinet, Government of India (1982-85)
- Member, International Task Force on Tropical Forestry, World Resources Institute, Washington (1984)
- Member, Council of the World Resources Institute, Washington (1988-)
- Member, Advisory Board of the World Resources Report (1989)
- Member, Plant Advisory Group of International Union for Conservation of Nature and Natural Resources, Switzerland
- Member, Scientific Committee of the International Lake Environment Committee, Tokyo (1988-)
- National Chairman of Scientific Committee on problems of Environment (SCOPE), New Delhi
- Member, National Committee on International Biosphere-Geosphere Programme, INSA, New Delhi

- Member of several national and international scientific bodies
- Delivered several prestigious invited lectures both in India and abroad

Recognition by Scientific Academies :

- Fellow, Indian National Science Academy, New Delhi.
- Fellow, Indian Academy of Science, Bangalore
- Fellow, National Academy of Sciences-India, Allahabad
- Fellow, Institution of Engineers, India
- Fellow, Indian Society of Genetics and Plant Breeding, New Delhi
- Fellow, Indian Botanical Society
- Fellow, Indian Academy of Agricultural Sciences.

Publications :

- Two hundred and nine original publications in journals and International repute in Cytogenetics as related to Evolution and Improvement. Economic Botany, Plant-Breeding, Energy Systems any Environmental Sciences.
- Authored 3 books and edited 8 books on environmental subjects.

BIODATA

PROPOSED POSITION: Project Coordinator/Resource Economist/Policy Analyst.

NAME: Prodipto Ghosh.

DATE OF BIRTH: 24 May 1947

NATIONALITY: India

EDUCATION:

- (i) Ph.D. Economics and Policy Analysis, Carnegie-Mellon University.
- (ii) M.Phil. Public Policy Analysis, Carnegie-Mellon University.
- (iii) B.Tech. Chemical Engineering (5 year professional degree) Indian Institute of Technology, Delhi.

OTHER TRAINING: Professional program (2 years) in the Indian Administrative Service (IAS), at the National Academy of Administration.

LANGUAGE AND DEGREE OF PROFECIENCY:

- (i) Bengali: Mother tongue.
- (ii) English: Speak, read, write: excellent.
- (iii) Hindi/Urdu: Speak, read, write: excellent.
- (iv) French: Speak, read, write: elementary.

MEMBERSHIP OF PROFESSIONAL SOCIETIES:

- (i) American Economic Association.
- (ii) Association of Environmental and Resource Economists, Washington, D.C.
- (iii) Indian Institute of Public Administration.
- (iv) Institution of Engineers, India.

COUNTRIES OF WORK EXPERIENCE:

- (i) India.
- (ii) Bangladesh.
- (iii) USA.

EMPLOYMENT RECORD:

My permanent affiliation, since 1969, is with the Indian Administrative Service (IAS). The IAS is the premier cadre of public policy and administration professionals in the Government of India, members are typically assigned to responsible positions in development administration, planning, public finance, public sector

industry, besides policy analysis and policy making positions in both the Central and State governments. I retain lien on the JAS at the level of Joint Secretary in the Central Government (or Minister-Counsellor).

(a) From: 2/91 To: present.

Employer: Tata Energy Research Institute, New Delhi (on deputation).

Position held: Senior Fellow.

Description of duties: My duties include policy research in the economics of climate change, technology options for climate change, the analysis of issues in negotiations for global environmental conventions, and quantitative models for policy analysis of energy/environmental issues.

Note: During the period from 8/85 to 7/90 I was on sabbatical at the Carnegie Mellon University. From 8/90 to 2/91 I was awaiting posting, while on the cadre strength of Delhi Administration as Commissioner and Secretary.

(b) From: 5/87 To: 7/97 and From: 1/89 To: 8/89.

Employer: World Resources Institute, Washington DC.

Position: International Consultant (Economist) (part time).

Description of duties: I was engaged in the preparation of project proposals for funding in the field of energy-environmental issues for developing countries. Additionally, I was involved in analysis of the implications of fiscal policies for natural resource use.

(c) From: 5/89 To: 7/89.

Employer: Food and Agriculture Organization, Investment Center, Rome.

Position: International Consultant (Economist).

Description of duties: I was engaged in the preparation of several projects in the agriculture/livestock sector in Bangladesh.

(d) From: 6/82 To: 7/85.

Employer: Ministry of Shipping and Transport, Govt. of India.

Position: Deputy Director General, Dept. of Shipping.

Description of duties: My responsibilities included appraisal of proposals for purchase of merchant ships with concessional Government finance, regulation of the merchant shipping industry, interaction with international agencies for multilateral shipping conventions and protocols, including those related to marine pollution (MARPOL), and providing administrative support to the technical and training branches.

,) From: 6/80 To: 6/82.

mployer: Arunachal Pradesh Administration (State Government).

osition: Secretary to Government.

escription of duties: My portfolios included Finance, Transport, and Civil Supplies. I was responsible for budgeting and expenditure control, planning, project and performance evaluation, and representing the administration before legislative committees. The responsibilities included the appraisal and expenditure sanctions of all development projects, including the infrastructure, energy, forest, and social welfare sectors. I also functioned as Secretary of the State Planning Board. The position involved frequent contact with the Planning Commission, and key Central Ministries.

f) From: 9/77 To: 5/80.

mployer: Ministry of External Affairs, Govt. of India.

osition: Deputy Secretary.

escription of duties: I was in charge of the personal office of the Foreign Minister. My responsibilities included the preparation of briefs, contact with legislators and the media, preparation of minutes of official discussions, writing speeches, and protocol matters. The position furnished intensive exposure to international negotiations practices, including in the trade, natural resources and environment (Law of the Sea) fields.

g) From: 1/76 To: 8/77.

mployer: Delhi Development Authority (DDA), Ministry of Works and Housing, Govt. of India.

osition: Commissioner.

escription of duties: The DDA is the principal government agency entrusted with urban development and housing in the Union Territory of Delhi. My portfolio was the Slums Department of the DDA. I was responsible for formulating and executing plans for improvement of urban slums, housing for "Economically Weaker Sections" (EWS), obtaining funding and expenditure sanctions, and resettlement of the families displaced.

h) From: 11/74 To: 12/76.

mployer: Delhi Administration (State Government).

osition: Additional Deputy Commissioner.

escription of duties: My responsibilities included land revenue and reforms administration, urban property taxes, law and order, disaster relief, and environmental protection.

(i) From: 7/73 To: 10/74.

Employer: Pondicherry Administration (State Government).

Position: Secretary to Government and Director of Education.

Description of duties: My responsibilities included administration of the education department which was responsible for primary schooling through college education, formulation and execution of development programs in the education sector (which included the setting up of a Central University), conduct of high school board examinations, and competitive examinations for admissions to professional colleges.

(j) From: 7/71 To: 6/73.

Employer: Pondicherry Administration (State Government).

Position: Project Executive Officer/ Under Secretary.

Description of duties: I was responsible for the execution of programs for rural and community development, besides planning, budgeting and expenditure control of development schemes. The position involved grass roots executive responsibility for development efforts. There were significant responsibilities regarding execution of biogas and rural environment programs.

(k) From: 7/69 To: 6/71.

Employer: National Academy of Administration, Govt. of India.

Position: IAS Probationer.

Description of duties: This entry level position included both classroom and practical training in public administration. The theoretical component was equivalent to a University Master's level program in public administration, while the practical aspects involved field level work. It also included a one-semester academic program in agriculture at the Pantnagar Agricultural University.

(l) From: 1/69 To: 6/69.

Employer: Chemical and Metallurgical Design Co., New Delhi.

Position: Chemical Engineer.

Description of duties: I was assigned to various specific tasks in process, plant and equipment design for several chemical plants.

11. DETAILED TASKS ASSIGNED:

(a) Resource Economist: Formal academic qualifications at the doctoral level as well as significant research and international consultancy experience.

(b) Policy Analyst: Formal academic qualifications at the doctoral level, professional training in the IAS, and long experience in policy making positions in Government.

(c) Project Co-ordinator: Extensive practical experience in public administration and management, including in field level positions.

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE:

P. M. P. J. B. H. S.

DATE:

5.2.92

BIODATA

PROPOSED POSITION : Policy Analyst

NAME : Rita Ravi Nangia

DATE OF BIRTH : 21 October, 1952

NATIONALITY : Indian

EDUCATION : (1) M.Sc. (Econ.) 1976
London School of Economics
(ii) B.A. (special) 1972
Gujarat University

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English: Read, write and speak fluently.

MEMBERSHIP OF PROFESSIONAL SOCIETIES : International Association for Energy Economics

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD : 'Annex A'

DETAILED TASKS ASSIGNED :
Completed a report on Energy for Tomorrow's World, for the South Asian Region of IEC. The study looked at the energy perspectives for all SAARC countries, plus Myanmar and identified key issues as also policy options facing these countries.
Co-authored an ADB study on India's Industrial Economy Review of Policies and Agenda for Reforms.

CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : *Rita R Nangia*

DATE OF SIGNING : 28 / 01 / 1992
DAY MONTH YEAR

Annex A

Rita Ravi Nangia

Work Experience

Visiting Fellow, The Tata Energy Research Institute

November 1983 - December 1989

Officer on Special Duty (Additional Economic Adviser), The Prime Minister's Office

The assignment included preparation of notes on the current economic situation, examination of memoranda received by the Prime Minister on economic and financial matters, preparation of notes and comments on proposals for the Cabinet, Cabinet Committees and Committees of Secretaries, developing and maintaining MIS for important economic and demographic parameters and liaison with the economic ministries.

November 1981 - October 1983

Economic Consultant, The Oil Coordination Committee (OCC), Ministry of Petroleum
OCC was set up by the Department of Petroleum to coordinate production, import, marketing and distribution of crude oil and petroleum products and to monitor investments in the oil sector in India.

As Economic Consultant, my assignment was to undertake in the areas of interest to OCC. While at OCC, I did work on the estimation of demand for different energy sources in India, evaluation of the alternative utilization patterns for some petroleum products like natural gas, naphtha, LPG and high diesel oil, preparation of review of feasibility reports, long term plans for the oil and gas sectors in the areas of investment planning, pricing and research and development policies.

April 1981 - November 1981

Economic Consultant, Engineers India Limited (EIL)

EIL is a major engineering consultancy organization in the public sector, specializing in process industries. Some of the studies undertaken by me at EIL were the determination of optimum sizes, time phasing of investments, locations and technologies for refineries and petro chemical and fertilizer plants.

November 1979 - March 1981

Consultant, Bureau of Industrial Costs and Prices (BICP), Department of Industrial Development, Government of India

BICP was set up by the Government as a successor to the Tariff Commission and its major function is to serve as an expert body to assist Government in assessing the cost structures of various industries and to suggest appropriate prices,

wherever required. It also advises Government regarding appropriate tariff rates and export incentives, and arising out of its work, on aspects of industrial policies.

As a Consultant, my responsibilities included evaluation existing tariff structures for various products. While at BICP, I completed detailed studies on the thermoplastics and synthetic fibres industries. In addition, as a special officer to an Expert Committee set up to determine the optimum alignment of a pipeline for transporting natural gas from off-shore fields to fertilizer plants and other users, I was responsible for evaluating the economics of gas transportation and in developing and using a large MIP model for simultaneous selection of plant locations.

November 1977 - November 1979

Consultant, Project Appraisal Division (PAD), Planning Commission, Government of India

PAD is responsible for carrying out economic and financial analysis of major public investments.

The work done by me at PAD included appraisal of various industrial and infrastructure projects, estimation of rates of return in transport and electricity undertakings (for the Seventh Finance Commission), preparation of annual price forecasts for 1978 and 1979 and evaluation of all import substitution projects to be undertaken during the Sixth Plan.

September 1976 - November 1977

Research Associate, Indian Institute of Management, Ahmedabad

As a Research Associate in the economics area at the Institute, my assignment was to develop teaching material for the post-graduate courses in managerial economics, econometrics and various economic policy courses. Some of the teaching notes prepared by me at the Institute were on farm mechanization in India, land reforms, the role of fiscal policy, various industry studies etc.

BIODATA

PROPOSED POSITION : Agriculture Specialist

NAME : Professor S.K. Sinha

DATE OF BIRTH : July 18, 1934

NATIONALITY : Indian

EDUCATION . Ph.D. Plant Biochemistry, University of Alberta, Edmonton, Canada. 1964.
Ph.D. Plant Physiology, Agra University, Agra, 1962.
M.Sc. Agra University, Agra, 1957.
B.Sc. Agra University, Agra, 1955.

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English, Hindi. Read, Write and Speak fluently.

MEMBERSHIP OF PROFESSIONAL SOCIETIES : President, Agriculture Section, Indian Science Congress Association (1986-87).
President, Agriculture Society of India (1986).
Secretary General, International Congress of Plant Physiology (1988).
Fellow, Indian National Science Academy.
Fellow, Indian Academy of Science.
Fellow, National Academy of Sciences.
Fellow, Indian Society of Genetics and Plant Breeding.

COUNTRIES OF WORK EXPERIENCE : India, Canada.

EMPLOYMENT RECORD :
(1) FROM 1991 : TO Present
EMPLOYER : Indian Agricultural Research, Institute, New Delhi.
POSITION HELD AND DESCRIPTION OF DUTIES : Director
(1) FROM 1978 : TO 1991
EMPLOYER : Indian Agricultural Research Institute, New Delhi.
POSITION HELD AND DESCRIPTION OF DUTIES : Professor of Eminence.

(ii) FROM 1972
EMPLOYER : TO 1978
POSITION HELD AND
DESCRIPTION OF DUTIES : Indian Agricultural Research
Institute, New Delhi.
(iii) FROM 1969
EMPLOYER : Senior Plant Physiologist.
POSITION HELD AND
DESCRIPTION OF DUTIES : TO 1972
EMPLOYER : Indian Agricultural Research
Institute, New Delhi.
POSITION HELD AND
DESCRIPTION OF DUTIES : Plant Physiologist.

(iv) FROM 1966
EMPLOYER : TO 1969
POSITION HELD AND
DESCRIPTION OF DUTIES : Central Tuber Crops Research
Institute, Trivandrum.
(v) FROM 1965
EMPLOYER : Plant Physiologist.
POSITION HELD AND
DESCRIPTION OF DUTIES : TO 1966
EMPLOYER : CSIR, New Delhi.
POSITION HELD AND
DESCRIPTION OF DUTIES : Pool Officer.
(vi) FROM 1964
EMPLOYER : TO 1965
POSITION HELD AND
DESCRIPTION OF DUTIES : University of Alberta, Edmonton,
Canada.
POSITION HELD AND
DESCRIPTION OF DUTIES : Post-Doctoral Fellow.
(vii) FROM 1957
EMPLOYER : TO 1962
POSITION HELD AND
DESCRIPTION OF DUTIES : DAV College, Kanpur.
POSITION HELD AND
DESCRIPTION OF DUTIES : Lecturer in Botany.

DETAILED TASKS ASSIGNED : Agriculture Specialist.
(i) Member, Scientific Advisory
Committee, 'Climate Programme',
United Nations Environmental
Programme, Nairobi.
(ii) Member, Environment Research
Committee, Department of
Environment.
(iii) Member, Man and Biosphere
Committee, Department of
Environment.
(iv) Member, Scientific Committee,
International Geosphere Biosphere
Programme.
(v) Invited Speaker on Global
Warming and Agriculture in Second
World Climate Conference, Geneva.

List of publications attached.

: I, the undersigned certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

: Sudha .

DATE OF SIGNING : 1 2 1992 .

DAY MONTH YEAR

BIODATA OF PROFESSOR S.K.SINHA

1. Name **Professor S.K.Sinha**
2. Date of birth **July 18, 1934**
3. Discipline **Plant Physiology (Agriculture & allied sciences)**
4. Present position & address **Director
Indian Agricultural Research Institute
New Delhi - 110012**

5. Position held	Period	Designation	Institution
Lecturer in Botany	1957-62	Lecturer	DAV College, Kanpur
Post - Doctoral Fellow	1964-65	Post-Doctoral Fellow	University of Alberta, Edmonton, Canada
Pool Officer	1965-66	Pool Officer	CSIR, New Delhi
Plant Physiologist	1966-69	Plant Physiologist	Central Tuber Crops Research Institute, Trivendrum
Plant Physiologist	1969-72	Plant Physiologist	IARI, New Delhi
Senior Plant Physiologist	1972-78	Sr. Plant Physiologist	IARI, New Delhi
Professor of Eminence	1978- onwards		IARI, New Delhi
FAO Consultant	Jan 1975- Mar 1975		FAO, Rome
Visiting Professor	Dec 1976- June 1977		University of Adelaide, Australia

6. Academic qualifications

B.Sc. 1955 Agra University, Agra.
M.Sc. 1957 1st Class 2nd Agra University, Agra.
Ph.D. 1962 Plant Physiology, Agra University, Agra.
Ph.D. 1964 Plant Biochemistry, University of Alberta,
Edmonton, Canada.

7. Other Awards/Honours already received including Fellowships of Professional bodies:

a) Fellow

1. Indian National Science Academy
2. Indian Academy of Science
3. National Academy of Sciences
4. Indian Society of Genetics and
Plant Breeding

b) Awards

1. FICCI Award for Agricultural
Research (1983)
2. VASVIK Award 1985 for Research in
Agricultural Sciences.
3. J.J. Chinoy Gold Medal (1979)
Indian Society for Plant Physiology
4. S.M. Sircar Memorial Award (1984)
Bengal Botanical Society
5. Om Prakash Bhasin Award for
Agricultural Research (1988)
6. Birbal Sahni Medal, Indian Botanical
Society (1989)
7. Jawahar Lal Nehru Fellowship 1991
8. FIE Foundation Award 1992

8) Scientific Societies	1. President: Agriculture Section Indian Science Congress Association (1986-87)
	2. President: Agriculture Society of of India (1986)
	3. Secretary General: International Congress of Plant Physiology (1988)
9. Ph.D. students	12
M.Sc. students	3

10. Special Assignment

1. Consultant, FAO, Rome, to write a book on the distribution, adaptability and the biology of yield of food legumes.
- 2 Member, Advisory Committee on Physiology and Biochemistry of drought resistance in plants, International Development Research Centre (IDRC), Canada.
- 3 Alf Hannaford Fellow (Visiting Professor), Waite Agricultural Research Institute, The University of Adelaide, Australia, December 1976 to June 1977.
- 4 Consultant for FAO/DANIDA Course on 'Food Legumes' held at Tehran, 1975.
- 5 Member, Scientific Panel on Physiology and Biochemistry, ICAR, New Delhi
- 6 Reviewer of Research Projects for ICAR, CSIR, UGC and other organisations.
- 7 Member, IARI, Research Council.
- 8 A member of the World Meteorology Organization Committee which issued a statement on Carbon Dioxide and Climate on behalf of WMO.
- 9 Member, Scientific Advisory Committee, 'Climate Programme', United Nations Environmental Programme, Nairobi.
- 10 Member, Environment Research Committee, Department of Environment.
- 11 Member, DST, Plant Physiology and Biochemistry Panel.
- 12 Member, UGC, Bioscience Panel
- 13 Member ICAR Team for NARP in APAU, Tamil Nadu Agricultural University, Udaipur University
14. Member ICAR Quinquenal Review Team for CRRI, Cuttack, AICRIP Hyderabad and All India Coordinated Rice Research Project Hyderabad.

Member Research Advisory Council, Central Institute for Medical and Aromatic Plants (CIMAP) Lucknow.

Member, Research Advisory Council, National Botanical Research Institute, Lucknow.

Member, Man and Biosphere Committee, Department of Environment Government of India.

Member, Editor Board, Journal of Agriculture Science (Cambridge) Effective January 1988.

Chairman, Research Advisory Council, CSIR Complex Palampur.

Chairman, Agrometeorology Advisory Committee, Department of Science & Technology, Government of India.

Member Core Group WMO for organizing Second World Climate Conference 1990.

Member Editorial Board, Field Crops Research, The Netherlands.

Member, Programme Advisory Committee, International Crop Science Congress 1992.

Member, Scientific Committee, International Geosphere Biosphere Programme.

Chairman, Scientific Advisory Committee, G.B.Pant Himalayan Institute of Environment and Development.

Member Governing Council, Indian Institute of Tropical Meteorology Pune

Member Science & Engineering Research Council, Department of Science & Technology Delhi.

Member Review Committee CIMMYT Crop Management and Plant Physiology Programme.

Chairman Research Council, Central Institute of Medicinal and Aromatic Plants Lucknow.

Co-Chairman Agriculture & Forestry Section, IPCC Working Group-II. WMO.

Invited Speaker on Global Warming and Agriculture in Second World Climate Conference Geneva.

Environmental Issues

1. Global change

'Climate change is an important international issue which includes agriculture as a source of greenhouse gases. In addition, the impact of climate change on agriculture is important from the point of view of food security.'

Professor Sinha has been associated with these aspects for a decade now and has presented a viewpoint of the developing countries. As regards the sources of methane, a potent greenhouse gas, he has now shown that rice-paddies constitute a very small source. The earlier reports attributing rice paddies as a major source were based on an erroneous extrapolation of results. His argument that the expression of data should be based on biomass of rice paddies under field conditions has been appreciated. Thus Prof. Sinha has done an important service to rice growing countries by his analysis. The main paper is enclosed.

A large number of reports analysing the impact of climate change have been based on controlled environment chambers at CO₂ concentrations of 600 to 900 ppm. These reports projected an advantageous effect of increased CO₂ on crops. However, Prof. Sinha through his analysis of projected climate change scenarios has shown that for crops such as rice a 1-2°C increase in temperature could have a profound effect by increasing sterility. Similarly in sub-tropical regions where temperatures increase during the grain filling period in wheat, 1-3°C increase in temperature could cause more harm than the advantage that could accrue from increased CO₂. He has analysed the effects of possible climate change on various crops of tropical regions and suggested that root and tuber crops could provide a greater stability to Food security. In addition, he has suggested the

lines of research which would help overcoming the adverse effects. The concept of 'Risk pooling' by smaller nations proposed by him has attracted considerable attention.

2. Drought and Drought Management

Drought is a common climatic aberration which affects agriculture, economic and political aspects of the society. Dr. Sinha has worked on the impact of drought and adaptation of crops to drought.

a) Adaptation to drought: One of the approaches is the identification and evolution of drought resistant crops and crop varieties to drought. This depends upon the intensity and duration of drought. Over a period last 15 years Professor Sinha and his colleagues have made the following points:

(i) Highest yielding varieties of wheat such as Moti, are more susceptible to drought. However, the most tolerant varieties such as C303 are relatively poor yielding. There is a good number of varieties such as Kalyansona and Arjun which are moderate in tolerance. The concept of the probability of drought need to be introduced. If a moderate yielding variety in a bad year performs poorer than the most tolerant, it does far better in good rainfall years. Therefore, in a period of 5 years, with a probability of one year being very bad, a moderate variety would be better suited for cultivation than a highly tolerant variety. Therefore, Professor Sinha has introduced the concept of average productivity in relation to probability of drought.

(ii) The crops are most sensitive to drought at the time of grain development. Therefore, any protection by way of a single irrigation through water harvesting, would give a high response in yield. (b) Management of drought: Once drought occurs, it is

important to give protection to those who need it most in respect of employment, food, health and other aspects. Analysis of the past data has shown that there has been a considerable improvement in drought management and yet there are several aspects which need attention. These are listed in a chapter in book on "Teleconnections linking worldwide climate anomalies - Scientific basis and societal impact" published by the Cambridge University Press.

Thus Professor Sinha made significant contributions in the field of Environmental awareness and management.

Plant Biochemistry

The importance of C1 compounds, particularly the involvement of folic acid and its derivatives in the biosynthesis of serine and methionine in plants was shown. The synthesis of serine from glycine was demonstrated for the first time in plants. This reaction became the basis of photorespiration subsequently. The work on cyanogenic glucosides in Cassava or Tapicca was important in selecting cyanide free clones. A method for reducing the cyanide content was also shown. It was shown by him and his colleagues that C4 photosynthesis characteristics are influenced by development and environment. This is now an accepted concept.

Physiological Genetics

Hybrid vigour is one important process which has contributed significantly to crop improvement but its basis is not understood. Studies by Professor Sinha and colleagues showed that how complementation could lead to enhanced leaf area development, plant height, increased 'sink' potential and other heterotic characteristics if the parents had contrasting features. On this basis it was shown

that no basic physiologicval process such as enzyme activity is improved in hybrids. It was postulated that in plants having tillering behaviour, such as wheat and rice, hybrid vigour will be achieved by increasing dry matter production and the 'sink' potential of each spike. This has nhow been proved by other scientists, nationally and internationally.

Physiological and biochemical basis of yield in pulses

The average yield of pulses have remained stagnant for the past three decades. Even the reasons for this were not understood. Studies by Professor Sinha and associates demonstrated that these plants produced a large number of flowers but hardly 10-15% of them set fruits. Therefore, the problem of yield was of non-availability of photoassimilates and reduced nitrogen at the time of reproductive phase. This is further complicated by environmental factors such as water and temperature stress. Response to irrigation is limited or lacking because the plants tend to resume vegetative growth. Therefore, selections specifically this objective have to be done. Other studies have shown as to how the management of these crops can improve productivity of pulses.

Remote sensing

Information on remote sensing parameters was required for assessing drought effects and predicting crop yields, to be used for Indian Remote Sensing Satellite. This information was generated in collboration with the Space Application Centre, Ahmedabad. The radiometers placed in IRS will be using some of this information.

Water management

Efficient water management, particularly on farm, is an important and urgent need of Indian agriculture. Researches by Professor Sinha and colleagues have shown the following: a) Irrigation water requirement should be assessed and recommended on the basis of soil-water-plant relationship and environmental factors. Studies showed that 5-6 irrigations to wheat are not necessary if the crop is grown on fallow land and 5-6 cm of winter rains come. In fact, one presowing irrigation and one at anthesis could give as much as 40 q/ha yield if 60 kg N/ha is given and 5-6 cm rain comes. These results clearly indicate that recommendations on irrigations must include and define other inputs. This will lead to optimization of irrigation.

b) In Sorghum one irrigation at anthesis could give an advantage of 60-85% in yield in north India.

c) Response to irrigation in pulses and oilseeds is not obtained because the varieties that have been tested were selected for unirrigated conditions. The whole strategy needs to be changed in this respect. A mutant M 109 selected for irrigated conditions has performed well under irrigated conditions.

PUBLICATION LIST OF PROF. S.K. SINHA

BOOKS

Sinha, S.K. et al. Proceedings of the International Congress of plant Physiology. 1990. New Delhi. Pub. Society for Plant Physiology and Biochem.

Swaminathan, M.S. & Sinha, S.K. 1985 (Eds.) Global Aspects of Food Production. Tycooly International & IRRI.

Kamat, D.S. & Sinha, S.K. 1984. (Eds.) Crop Growth Conditions and Remote Sensing. Proc. of the Seminar held at IARI, New Delhi, June 22-23, 1984.

Sen, S.P., Abrol, Y.P. & Sinha, S.K. 1978. (Eds.) Nitrogen Assimilation and Crop Productivity. Associated Publishing Co., Delhi.

Sinha, S.K. 1977. Food Legumes: Distributions, Adaptability & Biology of Yield. FAO, Rome.

REVIEWS & CHAPTERS

S. Selvarajan, S.K. Sinha, 1992. Climate variability and sustainability of agriculture - a Case study of India. ICID Symposium Brazil, January 1992.

Sinha, S.K. 1991. Impact of Climate Change on agriculture - a critical assessment. Proc. 2nd World Climate Conference. Geneva.

Kiladis, G. and Sinha, S.K. 1990. ENSO, Monsoon and Drought in India. In. ENSO Teleconnections Linking Worldwide Climate Anomalies : Scientific Basis and Societal Impact. Eds. M.H. Glantz, R.W. Katz and N. Nicholls. Cambridge University Press.

Khanna-Chopra and Sinha, S.K. 1990. Genetic aspects of water relations and drought resistance in crops. In Advances in Biochemical Genetics. Ed. K.R. Khanna, CRC Press.

Khanna-Chopra, R. and Sinha, S.K. 1990 : Climatic Variation in Relation to Productivity and Production of Pulses: A Case Study of India. In International Symposium on Climate and Food Security Delhi. Feb. 1987. Pub. International Rice Research Institute, Manila.

Sinha, S.K., Kailasanathan K. and Vasistha, A.K. 1987: Drought management in India: Steps towards eliminating famines. In Planning for drought. Eds. D.A. Wilhite, W.E. Easterling and D.A. Wood. p 453-470. Westview Press. Boulder U.S.A.

Sinha, S.K. 1987: The 1982-83 Drought in India: Magnitude and Impact. p 37-42. In M. Glantz Ed. The Societal Impacts Associated With The 1982-83 Worldwide Anomalies. National Centre for Atmospheric Research. Boulder U.S.A.

Sinha, S.K., Rao, N.H. and Swaminathan, M.S. 1988: Food Security in the Changing Global Climate. In Proc. World Conference on the Changing Atmosphere. Toronto. World Meteorological Organization Geneva.

Sinha, S.K. 1987: Contribution of Agricultural Research to the National Well Being and the Future Challenges. Presidential Address Section of Agricultural Sciences. Indian Science Congress Association 74th Session Bangalore.

Sinha, S.K. 1987: Drought Resistance in Crop Plants: A critical physiological and biochemical assessment. In. Drought Tolerance in Winter Cereals. Eds. J.P.Srivastava, E.Porceddu, E Acevedo and S.Verma. p.349-364. John Wiley & Sons Ltd

Saxena,M.C and Sinha,S.K. 1987: Synthesis_ Tackling the Problem of Low Yield and Yield Instability of Winter Cereals in the Mediterranean Areas of West Asia, North Africa, and Southern Europe. p 365-371. In Drought Tolerance in Winter Cereals. Eds. J.P.Srivastava,E.Porceddu,E.Acevedo and S.Varma,John Wiley & Sons Ltd.

Grover, A. and Sinha, S.K. 1987 'Sink' induced senescence in crop plants. In Recent Advances in Plant Biochemistry. Eds. R. Singh & S.K. Sawhney, pp. 59-81.Wiley India. Delhi

Khanna-Chopra, R. & Sinha,S.K. 1987. Chickpea: Physiological Aspects of Crop Yield. In Chickpeas. Eds. M.C. Saxena & K Singh, Commonwealth Agriculture Bureau, London. pp 163-170.

Sinha,S.K.1986: Water Conservation as a Means of Improving Agricultural Production and Stability in India.In. Conservation for Productive Agriculture. Eds. V.L.Chopra and T.N.Khosho p 98-116, Pub. Indian Council of Agricultural Research , New Delhi.

Sinha,S.K.1988. Drought Resistance in Crop Plants: A physiological and biochemical analysis. In. Approaches for incorporating Drought and Salinity Resistance in Crop Plants. p 56-86 Eds. V.L Chopra & R.S.Paroda. Oxford & IBH Publishing Co.Ltd.

Sinha, S.K. 1985: Morphological and physiological requirements of a productive plant of chickpea. In Faba Beans, Kabuli Chickpeas, Lentils in the 1980s. Eds. M.C.Saxena and S.Varma p 209-218. ICARDA Aleppo, Syria.

Sinha, S.K. 1985. Energy Balance in Agriculture: The Developing Countries. In Global Aspects of Food Production. Eds. M.S. Swaminathan & S.K. Sinha. Tycooly International and IRRI,p.57-84.

Sinha, S.K., Aggarwal, P.K. and Khanna-Chopra, R. 1984. Irrigation in India: Physiological and phenological approach to water management in grain crops. Advances in Irrigation. Academic Press, 3, 129-212.

Sinha, S.K. & Swaminathan, M.S. 1983. New Parameters & Selection Criteria in Plant Breeding. In Contemporary Basis of Crop Breeding. Eds. P.dB. Vose and S.G. Blixt. Pergamon Press. Oxford, England 1-35.

Sinha, S.K., Khanna-Chopra, R., Aggarwal, P.K., Chaturvedi, G.S. and Koundal, K.R. 1982. Effects of drought on shoot growth: Significance of metabolism to growth and yield. pp 153-170. In International Rice Research Institute, Drought Resistance in Crops, IRRI, Manila, Philippines. *

Sinha, S.K. & Nicholas, D.J.D. 1981. Nitrate Reductase in Relation to Drought Resistance. In Physiology & Biochemistry of Drought Resistance. Eds. L.G. Paleg & D. Aspinall, Academic Press, Sydney, 145-169.

Sinha, S.K. and Savithri, K.S. 1978. Biology of yield in food legumes. In Pests of Grain Legume, Ecology and Control. Eds. S.R. Singh, H.F. Van Emden and A.A. Jibola Taylor. Academic Press, N. York. p. 233-240.

Sinha, S.K. & Khanna, R. 1975. Physiological, Biochemical & Genetic Basis of Heterosis. Advances Agron. 27, 123-174. Academic Press, New York.

Research Papers

Sinha, S.K. and Swaminathan, M.S. 1990: Deforestation, climate change and sustainable food security. Climatic Change. Special Issue for Second World Climate Conference (in press)

Bansal, K.C. and Sinha, S.K. 1990: Assessment of drought resistance in *Triticum aestivum* L. and related species. I. Total dry matter and grain stability. *Euphytica* (Accepted)

Bansal, K.C. and Sinha, S.K. 1990: Assessment of drought resistance in *Triticum aestivum* L. and related species II. Stability in yield components. *Euphytica* (Accepted).

Reddy, P.V., Khanna-Chopra, R. and Sinha, S.K. 1990: Combined effect of water stress and reproductive sink in cowpea I. Water relations, growth and senescence. *Physiologia Plantarum* (Accepted)

Reddy, P.V., Khanna-Chopra, R. and Sinha, S.K. 1990: Combined effect of water stress and reproductive sink in cowpea II. Nitrogen balance. *Physiologia Plantarum* (Accepted)

Reddy, P.V., Khanna-Chopra, R. and Sinha, S.K. 1990: Combined effect of water stress and reproductive sink in cowpea III. Ultrastructural changes in mesophyll cells. *Physiologia Plantarum* (Accepted).

Kumar, S., Patil, B.C. and Sinha, S.K. 1990. Cyanide resistant respiration is involved in raising temperature of ripening mangoes. *Biochem. Biophys. Research Commu.* 168. 818-822.

Gangadhar Rao and Sinha, S.K. 1990. Influence of leaf area on the maintenance of water potential in sorghum hybrid (CSH-6) and its parents under limited soil volume condition. *Indian J. Agric. Sci.* (Accepted).

Savitri-Singh, K.S., Ganapathy, P.S. and Sinha, S.K. 1989. Importance of source on pod development in cultured excised twigs of *Cicer arietinum* L. *Indian J. Expt. Biol.* 27: 283-287.

Khanna-Chopra, R. and Sinha, S.K. 1988: Enhancement of drought-induced senescence by the reproductive sink in fertile lines of wheat and sorghum. *Ann. Bot.* 61. 649-653.

Koundal, K.R., Khanna, S. and Sinha, S.K. 1987: Relationship of nitrogenase activity to leghaemoglobin and sugar content in nodules of Chickpea, *Cicer arietinum* L. *Indian Jour. Experimental Biology*, 25 785-788.

Aggarwal, P.K. and Sinha, S.K. 1987: Performance of wheat and triticale in a variable soil water environment IV. Yield components and their association with grain yield. *Field Crops Research* 17, 45-53.

Aggarwal, P.K. and Sinha, S.K. 1987: Response of droughted wheat to mid-season water application: Recovery in leaf area its effect on grain yield. *Australian J. Plant Physiology*, 14. 227-237.

Sinha, S.K., Aggarwal, P.K., Chaturvedi, G.S., Singh, A.K. and Kailasanathan, K. 1986. Performance of wheat cultivars in a variable soil water environment. I. Grain yield stability. *Field Crop Research* 13, 289-299.

Aggarwal, P.K., Chaturvedi, G.S., Singh, A.K. and Sinha, S.K. 1986. Performance of wheat cultivars in a variable soil water environment. II. Evapotranspiration, water use efficiency, grain rain yield. *Field Crop Research* 13, 301-315.

Chaturvedi, G.S., Aggarwal, P.K., Singh, A.K. and Sinha, S.K. 1985. Effect of date of sowing on the relative behaviour of mother shoot and tillers in wheat. *Indian J. Agric. Sci.* 55, 87-98.

Grover, A., Koundal, K.R. and Sinha, S.K. 1985. Senescence of attached leaves: Regulation by developing pods. *Physiol. Plantarum*. 63, 87-92.

Grover, A. and Sinha, S.K. 1985. Senescence of detached leaves in pigeon pea and chick pea: Regulation by developing pods. *Physiol. Plant.* 65. 503-507.

Grover, A. and Sinha, S.K. 1985: Age dependent changes in endogenous phenolics content in relation to extractable enzyme activities in pigeon pea leaves. *Indian J. Expt. Biol.* 23. 224-226.

Grover, A. and Sinha, S.K. 1985: Relationship of developing pods with photosynthetic characteristics of leaves in chick pea. *Proc. Indian Acad. Sci. (Plant Sci.)* 95. 333-340.

Khanna-Chopra, R., Koundal, K.R. and Sinha, S.K. 1984. A simple technique of studying water deficit effects on nitrogen fixation in nodules without influencing the whole plant. *Plant Physiology* 76 : 254-256.

Aggarwal, P.K. and Sinha, S.K. 1984. Differences in water relations and physiological characteristics in leaves of wheat associated with leaf position on the plant. *Plant Physiol.* 74(4), 1041-1045.

Aggarwal, P.K. & Sinha, S.K. 1984. Effect of water stress on grain growth and assimilate partitioning in two cultivars of wheat contrasting in their yield stability in a drought environment. *Ann. Bot.* 51(3) : 329-340.

Aggarwal, P.K., Khanna-Chopra, R. and Sinha, S.K. 1984. Change in leaf water potential in relation to growth and dry matter production. Indian J. Expt. Biol. 22, 98-101.

Sinha, S.K., Lal, B., Koundal, K.R. and Khanna-Chopra, R. 1983. Nitrogen fixation does not limit yield in pulses. Curr. Sci. 52, 916-918.

Aggarwal, P.K. and Sinha, S.K. 1983. Dynamics of root and shoot growth during water stress and recovery in maize and cucumber seedlings. Pl. Physiol. & Biochem. 10, 104-115.

Ajai, Kamat D.S., Chaturvedi, G.S., Singh, A.K. and Sinha, S.K. 1983. Spectral assessment of leaf indexs, chlorophyll content and biomass of chickpeas. Photo-grammetric Engineering & Remote Sensing. 49, 1721-1727.

Aggarwal, P.K. & Sinha, S.K. 1983. Water stress and water use efficiency in field growth wheat : A comparison of its efficiency with that of C4 plants. Agricultural Meteorology, 29, 159-167.

Aggarwal, SP.K. & Sinha, S.K. 1983. Relationship between mother shoot and tillers as a criterion of selection for wide or specific adaptability to drought in wheat. Z. Acker-uad Pflanzenbau (J. Agron. & Crop Science), 152, 310-320.

Bhatia, V.S., Bhargava, S.C & Sinha, S.K. 1983. Effect of irrigation on reproductive efficiency of bunch and spreading types of groundnut (*Arachis hypogaea*). J. Agri. Sci. (Camb.) 102, 505-508.

Koundal, K.R. & Sinha, S.K. 1983. Evaluation of the significance of malic acid secretion in chickpea. Physiol. Plant. 8, 189-192.

Koundal, K.R., Sawhney, S.K. and Sinha, S.K. 1983. Oxidation of 2-mercapto-ethanol in the presence of Tris buffer. Phytochemistry 22, 2183-2184.

Sinha, S.K. 1983. Sorghum and its environment. p. 121-124. In. Sorghum in the Eighties; Proc. of the International Symposium on Sorghum, 2-7 Nov. 1981, ICRISAT, India.

Srinivasan, Sawhney, S.K., Kumar, S., Mohanty, P., Sinha, S.K. and Naik, M.S. 1983. Detection of nitrate reductase activity in nitrate reductase deficient mutants of barley (*Hordeum vulgare*). Plant Science Letters, 30, 17-23.

Kamat, D.S., Ajai, M.N., Shashi Kumar, Sinha, S.K., Chaturvedi, G.S. and Singh, A.K. 1983. Relationship of special parameters of wheat crop with yield. Indian J. Agric. Sci. 53, 83-93.

Misra, S.P., Sinha, S.K. & Rao, N.G.P. 1982. Heterosis and combining ability for amylases activity in germinating seeds of sorghum. Zeitschrift fur Pflanzenzuchtung, 89, 187-191.

Sinha, S.K. 1982. The impact of carbon dioxide on agriculture in developing countries. Impact of Science on Society, 32, 312-323.

Sinha, S.K. 1982. Genetics of source and sink in wheat. In. Wheat Genetics and Improvement. II. Ed. A.K. Gupta, 3-10.

Khanna-Chopra, R. and Sinha, S.K. 1982. Photosynthesis rate and photosynthetic carboxylases during growth and development in Bengal gram cultivars. *Photosynthetica* 16, 508-513.

Sinha, S.K., Koundal, K.R. and Khanna-Chopra, R. 1982. Selection of Bengal gram (*Cicer arietinum* L.) mutants for late sown conditions in North India. *Current Science*. 51, 289-291.

Sinha, S.K., Bhargava, S.C. and Goel, A., 1982. Energy as the basis of the harvest index. *J. Agri. Sci. (Camb.)* 79, 237-238.

Sinha, S.K. 1982. Sorghum in the eighties. Proc. International Symposium on Sorghum. 2-7 Nov. 1981., ICRISAT Patancheru, India, 121-124.

Sinha, S.K. 1982. Yield components, yield and plant ideotypes in food legumes Sircar Memorial volume. Recent Developments in Plant Sciences, 295-304. Ed. S.P. Sen, Today & Tomorrow, New Delhi.

Misra, S.P., Sinha, S.K. and Rao, N.G.P. 1981. Genetic analysis of nitrate reductase activity in relation to yield heterosis in sorghum. *Zeitschrift fur Pflanzenzuchtung* 89, 11-19.

Chaturvedi, G.S., Aggarwal, P.K., Singh, A.K., Joshi, M.G. and Sinha, S.K. 1981. Effect of limited water availability on tillering in wheat, triticale and barley. *Irrigation Science* 2(4), 225-236.

Sinha, S.K., Aggarwal, P.K., Chaturvedi, G.S., Koundal, K.R. and Khanna-Chopra, R. 1981. A comparison of physiological and yield Jour. Agri Sci. (Camb.) 97: 233-236.

Koundal, K.R. and Sinha, S.K. 1981. Malic acid exudation and photosynthetic characteristics in *Cicer arietinum*. *Phytochemistry* 20, 1251-1252.

Aggarwal, P.K., Chaturvedi, G.S. and Sinha, S.K. 1981. Water potential in relation to stomatal resistance and leaf growth in some cereals. *Ind. J. exptl. Biol.* 9 : 882-884.

Aggarwal, P.K., Chaturvedi, G.S. and Sinha, S.K. 1981. Day time changes in chlorophyll content in plants by high temperature and radiation. *Ind. J. Exptl. Biol.* 19 : 1127-1130.

Aggarwal, P.K., Chaturvedi, G.S. and Sinha, S.K. 1981. Frequency distribution of yield components as an index of stability in wheat at different levels of water availability. *Proc. Ind. National Academy* B.47(5) : 756-767.

Khanna-Chopra, R. and Sinha, S.K. 1981. RuBP carboxylase activity in wheat following ear emergence and evaluation of the role of ear. *Photosynthesis Research*. 2(3) : 145-152.

Chaturvedi, G.S., Aggarwal, P.K. and Sinha, S.K. 1981. Effect of limited water availability on the stability of leaf size of wheat, triticale and barley. Ind. J. Agric. Sci. 5(10):738-745.

SSinha, S.K. and Rajagopal, V. 1981. Proline stimulates nitrate reductase in turgid tissue. Ind. J. Exptl. Biol. 19 : 195-196.

Khanna-Chopra, R. and Sinha, S.K. 1981. Photosynthetic carboxylases and leaf area development in relation to hybrid vigour. In *Sorghum vulgare L.* In Proceedings of Sorghum in 80's, ICRISAT, Patancheru, Hyderabad, India.

Jain, H.K. and Sinha, S.K. 1981. Droughts and new agricultural technology. Proceedings WHO Symposium on Meteorological Aspects of Tropical Drought, Dec. 7-11, 1981.

Shanta, I.M., Mehta, S.L., Roudal, K.R. and Sinha, S.K. 1982. Photosynthesis and translocation in high lysine mutant barley. Phytochemistry 21, 1183-1187.

Sinha, S.K. 1980. Water availability and grain yield in pigeonpea. Proceedings of the International Workshop on Pigeonpeas. Vol.1, ICRISAT Centre, Patancheru, 283-288.

Rajagopal, V. and Sinha, S.K. 1980. Influence of exogenously supplied proline on the relative water content in wheat and barley. Indian J. Expt. Biol. 12, 1523-1524.

Nagarajan, S., Sinha, S.K., Joshi, L M and Sari, E.E. 1980. Interaction between karnal bunt in wheat and leaf rust infection in North India. Pfl. Krankh, Pfl. Schutz, 87, 221-226.

Savithri, K.S., Ganapathy, P.S. and Sinha, S.K. 1980. Sensitivity of low temperature in pollen germination and fruitset in *Cicer arietinum*. J. Expt. Bot. 31, 475-481.

Sinha, S.K. and Rajagopal, V. 1980. Photosynthetic characteristics and nitrate reductase activity during development of flag leaf of wheat. Photosynthetica 14, 189-192.

Khanna-Chopra, R., Chaturvedi, G.S., Aggarwal, P.K. and Sinha, S.K. 1980. Effect of potassium on growth and nitrate reductase during water stress and recovery in maize. Physiol. Plant. 49, 495-600.

Sinha, S.K., Sarkar, K.R. and Singh, N.N. 1980.. Physiological efficiency and problem of selection for crop productivity. Proc. Higher productivity in Agriculture. Eds. D.K. Das Gupta and H.C. Chattopadhyay, Oxford & IBP Pub. Calcutta, p. 31-42.

Sinha, S.K. 1980. Possibility of photosynthesis as a source of fuel energy in India. Proc. Biological Application of Solar Energy. Ed. Krishnaswamy, Gnanam & Kahn, McMillan India Ltd.

Khanna-Chopra, R. and Sinha, S.K. 1980. Genetical aspects of photosynthesis in crop plants. Proc. Biol. Application of Solar Energy. Ed. Krishnaswamy, Gnanam * Kahn, McMillan India Ltd.

Sinha, S.K. and Aggarwal, P.K. 1980. Physiological basis of achieving the productivity potential of wheat in India, Ind. J. Gen. 40(2) : 375-384.

Tomar, D.P.S., Deshmukh, P.S. and Sinha, S.K. 1979. Importance of sepals in seed yield in linseed (*Linum usitatissimum*) Euphytica 28, 739-745.

Chaturvedi, G.S., Aggarwal, P.K. and Sinha, S.K. 1979. Growth and yield of determinate and indeterminate cowpeas in dryland agriculture. J. Agri. Sci. (Camb.) 94, 137-144.

Sinha, S.K. 1979. Energy Balance in Indian Agriculture. URJA 6, 215-218.

Sinha, S.K. and Swaminathan, M.S. 1979. The absolute maximum production potential in India. Curr. Sci. 40, 425-429

Koundal, K.R., Khanna-Chopra, R., Nandanwar, S.N & Sinha, S.K. 1979. Variability nodulation, nitrogen and carbon fixation in *Cicer arietinum* mutants during growth and development. Symposium: Legumes in Tropics. Pakulti Pertanian University Pertanian Malaysia, Serdang Selangor, Malaysia.

Khanna-Chopra, R., Koundal, K.R. and Sinha, S.K. 1979. Response of pigeonpeas to water availability, Ibid.

Sinha, S.K. 1978. Influence of potassium on tolerance to stress. Indian experience. In. Potassium in soils and crops. Ed. G.S. Sekhon, 223-240.

Sinha, S.K., Aggarwal, P.K. and Chaturvedi, G.S. 1978. Physiological and biochemical analysis of adaptability in wheat. Proc. of the 5th International Wheat Genetics Symposium, New Delhi, p. 946-953.

Sinha, S.K. 1978. Nodulation growth and yield in pulse crops. In Nitrogen Assimilation and Crop Productivity, p. 27-43.

Sinha, S.K. and Rajagopal, V. 1978. Effect of moisture stress on proline accumulation in sorghum and wheat. In. Nitrogen Assimilation and Crop Productivity. p. 158-163.

Savithri, K.S., Ganapathy, P.I.G and Sinha, S.K. 1978. Fruit and seed development in mung beans (*Phaseolus aureus* Roxb.). J. Agric. Sci. (Camb)., 90, 551-556

Sinha, S.K. 1978. Photosynthetic efficiency in relation to agriculture. Symposium on Basic Sciences and Agriculture. INSA Bulletin No. 55, New Delhi, p 116-124.

Rajagopal, V., Balasubramanian, V. and Sinha, S.K. 1977. Diurnal fluctuations in RWC.nitrate reductase and proline content in water-stressed and non-stressed wheat. Physiol. Plant 40, 69-71.

Rajagopal, V., Rao, N.G.P. and Sinha, S.K. 1977. Nitrate reductase in sorghum. I. Variation in cultivars during growth and development. Indian J. Gen. 36, 156-161.

Ghildyal, M.C. and Sinha, S.K. 1977. Physiological analysis of heterosis in Zea mays L: Part I. Changes in sugars, Indian Journal of Experimental Biology, 15, 899-904.

Ghildyal, M.C. and Sinha, S.K. 1977. Physiological analysis of heterosis in Zea mays L. Part II. Respiration and Acetate-2-14C Metabolism in the Developing Grains. Indian Journal of Exptl. Biology 15, 905-907.

Ghildyal, M.C. and Sinha, S.K. 1977. Physiological analysis of heterosis in Zea Mays L. Part III. Sucrose Uptake and Utilization by Developing Grains. Indian Journal of Exptl. Biology. 15 : 908-912.

Khanna-Chopra, R. and Sinha, S.K. 1977. Physiological and biochemical analysis of hybrid vigour in sorghum. Part I - Germination and Seedling Growth. Indian Journal of Expt. Biology 15 : 913-917.

Sinha, S.K. and Sane, P.V. 1976. Relative photosynthesis rate in leaves and fruit wall of peas. Indian J. Expt. Biology 14 : 592-594.

Sinha, S.K. 1976. Genetical aspects of photosynthetic potential in crop plants. Plant Biochem. J. 3 : 81-90.

Balasubramanian, V. and Sinha, S.K. 1976. Effect of salt stress on nodulation and nitrogen fixation in *Cicer arietinum*. Jour. Agril. Sci. (Camb.) 87 : 465-466.

Balasubramanian, V. and Sinha, S.K. 1976. Effect of salt stress on growth, nodulation and nitrogen fixation in cowpea and mung beans. Physiol. Plant 36 : 197-200.

Sinha, S.K., Balasubramanian, V., Khanna-Chopra, R. and Shanthakumari, P. 1976. Growth analysis and photosynthetic systems in relation to hybrid vigour in maize. Indian J. Expt. Biol. 14, 459-462.

Desmukh, P.S., Tomar, D.P.S. and Sinha, S.K. 1976. Contribution of sepals to seed yield per boil in flx. Photosynthetica. 10 : 136-139.

Sinha, S.K. and Khanna-Chopra, R 1975. High carboxylase to chlorophyll ratio in the reproductive organs of crop plants Plant Biochem.J. 2, 29-32.

Shanthakumari, P , Balasubramanian, V and Sinha, S.K. 1975. Distribution of photosynthates in chickpea (*Cicer arietinum* L.). Indian. Expt Biol. 13, 208.209.

Khanna, R. and Sinha, S.K. 1974 Phosphoenolpyruvate carboxylase in relation to hybrid vigour in sorghum. Preliminary evidence of isozymes in a hybrid sorghum. Plant Biochem.J. 1, 32-36.

Sinha, S.K., Ramanujam, S. and Swaminathan, M.S. 1974. Yield of the main species of grain legumes experimentally and in farm practice in different agro-ecological regions of the world.- the apparent technical reasons for the differences between research and practice. Proc. TAC working group on biology of yield in grain legumes, New Delhi.

Shanthakumari, P. and Sinha, S.K. 1974. Nitrate reductase in relation to nodulation in cowpeas and mung beans. Curr. Sci. 43 545-547..

Sinha, S.K., Rajagopal, V. and Balasubramanian, V. 1974. Nitrate reductase in wild and cultivated wheats. Curr. Sci. 43 : 617.

Baldev, B. and Sinha, S.K. 1974. Effect of TIBA on yield and photosynthetic enzyme in red gram. Curr. Sci. 43 : 94.

Khanna, R. and Sinha, S.K. 1974. Photosynthetic enzymes in wild and cultivated wheats. Curr. Sci. 44 : 259

Sinha, S.K. 1974. Improvement in the yield of pulse crops : A physiological and biochemical approach. Recent Advances in Plant Sciences. iv, 29-42, Pub. U.P. Institute of Agri. Sciences, Kanpur

Sinha, S.K. 1973. Yield of grain legumes . Problems and Prospects. Ind. J. Gen. 34A, 585-594.

Sinha, S.K. 1973. Further studies on the mechanism of tuberization in Manihot esculenta. Ind. J. Gen. 34A, 788-792.

Shanthakumari and Sinha, S.K. 1973 Studies on the variability in photosynthesis in cowpeas (*Vigna sinensis*). Ind J. Gen. 34A, 788-792.

Khanna, R. and Sinha, S.K. 1973 Photosynthesis and photosynthetic enzymes in reproductive organs of some crop plants. Indian J. Gen. 34A, 810-817.

Balasubramanian, V., Rajagopal, V. and Sinha, S.K. 1973. Stability of nitrate reductase under moisture stress and salt stress in some crops. Ind. J. Gen. 34A, 817-822.

Nair, T.V.R., Sinha, S.K. and Abrol, Y.P. 1973 Protease and nitrate reductase activity in two sorghum hybrids CSH.2 and CSH.3. Ind. J. Gen. 34A, 823-826

Jain, H.K., Sinha, S.K., Kulshrestha, V.P and Mathur, V.S. 1973. Breeding for yield in dwarf wheats. Proc IV. International Wheat Genetics Symposium, Columbia, USA, p 527-531.

Khanna, R. and Sinha, S.K. 1973. Change in the predominance from C4 to C3 pathway following anthesis in sorghum. Biochem. Biophys. Res. Comm. 52 : 121-126.

Sinha, S.K. 1973 Sucrose uptake and utilization as index of metabolic 'sink' in developing grains of wheat. Seed Research 1 : 49-54.

Sinha, S.K. and Ghildyal, M.C. 1973. Increase in yield of Bengal gram (*Cicer arietinum* L.) by 2,3,5-trilobenzoinic acid. *Crop Sci.*, 283-284.

Ghildyal, M.C. and Sinha, S.K. 1973. Physiological analysis of heterosis in maize. *Indian J. Gen. & Plant Breeding* 33 : 297- 303.

Sinha, S.K., Tomar, D.P.S. and Deshmukh, P.S. 1973. Photoperiodic response and yield potential in *sesamum* genotypes. *Indian J. Gen. & Plant Breed.* 33 : 293-296.

Sinha, S.K., Tomar, D.P.S., Deshmukh, P.S. and Bhargava, S.C. 1973. Photoperiodic response and yield potential in linseed varieties. *Indian J. Agri. Sci.* 43 : 1009-1012.

Ghose, Renuka, Abrol, Y.P. and Sinha, S.K. 1973. Amylase heterosis and complementation in sorghum. *Plant Science Letters* 2, 173-176..

Sinha, S.K. and Khanna, R. 1972. Development changes of photophosphorylation rate in wild and cultivated wheats. *Photosynthetica* 6 : 195-196.

Shanthakumari, P. and Sinha, S.K. 1972. Variation in chlorophylls and photosynthetic rate in cultivars of Bengal gram (*Cicer arietinum* L.). *Photosynthetica* 6, 189-194.

Khanna, R. and Sinha, S.K. 1972. Is endogenous aspartate aminotransferase enzyme based phosphoenolpyruvate carboxylase assay valid for comparing genotypes and treatment. *Indian J. Biochem. Biophys.* 9 : 215-217.

Sinha, S.K. and Ghildyal, M.C. 1972. Genetic variability in the uptake distribution and utilization of sulphate in maize. *Indian J. Gen. & Plant Breed.* 32 : 543-548.

Ghildyal, M.C. and Sinha, S.K. 1972. Variation in photorespiration in wheat genotypes using glycine-C14 decarboxylation technique. *Indian J. Expt. Biol.* 11, 207-209.

Ghildyal, M.C. and Sinha, S.K. 1971. Transmination of glutamic acid during germination, growth and development in Bengal gram. *Phytochemistry*, 10 : 2959-2963.

Reddy, B V S and Sinha, S.K. 1971. Genetic control of photosynthetic activity and its importance in plant breeding. *Indian J. Genet. & Plant Breed.* 31 : 94-104.

Sinha, S.K. and Nair, T.V.R. 1971. Leaf area during growth and yielding capacity of cassave. *Indian J. Genet. & Plant Breed.* 31 : 16-20.

Sinha, S.K., Nair, T.V.R. and Rao, N G F. 1971. Amylase complementation as a criterion of combining ability in sorghum. In *Sorghum in Seventies*. Eds. N.G.F. Rao and L.R. House, p 536 539

Khanna, R., Shanthakumari, P. and Sinha, S.K. 1971. A comparative study of carboxylase in maize, sorghum and some grain legumes. In "International Seminar on the Use of Nuclear Techniques in Agriculture", New Delhi. 505-510.

Sinha, S. K. 1971. Plant regulators in the advancement of agriculture. Everyman's Science 6 : 22.

Abrol, Y.P., Uprety, D.C. and Sinha, S.K. 1970. Darkening of whole wheat meal and its prevention. Jour. Food Sci. & Tech. 7 : 159.

Indira, P. and Sinha, S.K. 1970. Studies on the initiation and development of tubers in *Manihot esculenta* Crantz. Ind. J. Plant Physiol. 13 : 24-39.

Sinha, S.K., Magoon, M.L. and Indira, P. 1970. Note on the possibility of controlling increased cyanoglucoside content in Cassava tubers caused by higher application of nitrogen. Indian J. Agri. Sci 40 : 573-578

Indira, P. and Sinha, S.K. 1969. Colorimetric method for determination of HCN in tubers and leaves of Cassava (*Manihot esculenta* Crantz). Indian J. Agri. Sci., 39 : 1021-1023.

Abrol, Y.P., Sirohi, G.S., Sinha, S.K. 1969. Reversal of inhibitory effects of X-rays on the seedling growth of wheat by the application of IAA, tryptophane and zinc. Indian J. Expt. Biol. 7 : 114-116.

Sinha, S.K. 1969. Cyanogeneic glucoside production and its possible control in Cassava. Indian J. Plant Physiol. 12 : 140-147.

Abrol, Y.P., Sirohi, G.S. and Sinha, S.K. 1968. Influence of indole acetic acid and gibberellic acid on Phenylalanine aminotransferase activity in vitro Indian Journal of Expt. Biol. 6 : 192-195.

Magoon, M.L. and Sinha, S.K. 1968. Non-conventional food importance of subsidiary root and tuber crops in India. In National Seminar on Food and Agriculture, 318-333.

Nair, T.V.R. and Sinha, S.K. 1968. Photoperiod effects of tuber development in *Manihot esculenta* Crantz Indian J Expt Biol

Sinha, S.K. and Nair, T.V.R. 1968. Studies on the variability of cyanogeneic glucoside content in Cassava tubers. Indian J. Agri. Sci. 38 : 598

Sinha, S.K. 1968. Glycolate-2-C14 metabolism by non-photosynthetic plant tissues Indian J. Expt Biol. 6 : 60-62.

Sengupta, U K , Sirohi, G.S and Sinha, S.K. 1967. Influence of plant hormones on the transamination of glycine in vitro. Indian J. Biochem 4 : 187-188.

Sinha, S.K., Sirohi, G.S. and Abrol, Y.P. 1967. Studies on phenylpyruvate transaminase in plant tissue homogenates. Indian J. Expt. Biol. 5 : 190-191.

Sinha, S.K. and Nair, T.V.R. 1967. Influence of nutrition on the cyanoglucoside content in Cassava (*Manihot esculenta* Crantz.). In International Seminar on Tropical Horticulture, p. 280-287.

Cossins, E.A. and Sinha, S.K. 1966. Studies of glycollate utilization and some associated enzymes of C1 metabolism in the endosperm of *Ricinus communis*. J. Expt. Bot. 18 : 215-228.

Cossins, E.A. and Sinha, S.K. 1966. The interconversion of glycine and serine by plant tissue extracts. Biochem. J. 101 : 452-457.

Sinha, S.K. 1966. Influence of different sources of nitrogen on the metabolism of acetate-2-C14 by the germinating castorbean endosperm and roots. Indian J. Expt. Biol. 4 : 129-130.

Sinha, S.K. 1966. Occurrence of L. amino : 2-glyxylate aminotransferase in lower plants Indian J. Biochem 3 : 14-16.

Saxena, S.S. and Sinha, S.K. 1966. Interaction of nitrogen phosphorus and pH on yield of linseed. Indian J. Plant Physiol. 9 : 22-28.

Sinha, S.K. and Cossins, E.A. 1965. The importance of glyoxylate in amino acid biosynthesis in plants. Biochem. J. 96 : 254-261.

Cossins, E.A. and Sinha, S.K. 1965, The utilization of carbon-compounds by plants II The formation and metabolism of formate by higher plant tissues Canadian J. Biochem 43 : 685-698.

Sinha, S.K. 1985. Metabolism of germinating fatty seeds. In growth and development of plants. Eds. R.D. Asana and K.K. Nanda, 243-254.

Sinha, S.K. 1965. Carbon dioxide fixation by the germinating sunflower cotyledons. Indian J. Plant Physiol. 8 : 111-118.

Sinha, S.K. and Saxena, S.S. 1965. Reproductive character in linseed as affected by different levels of nitrogen phosphorus and pH. Canadian J. Plant Sci. 45 : 251-257.

Sinha, S.K. and Saxena, S.S. 1965. Growth and yield of *Linum usitatissimum* at different levels of pH in sand culture. Indian J. Agron. 10 : 283-288

Sinha, S.K. and Cossins, E.A., 1965 Pathways for the metabolism of glyoxylate and acetate in germinating fatty seeds. Canadian J. Biochem. 43 : 1531-1541.

Cossins, E.A. and Sinha, S.K. 1965. Occurrence and properties of L-amino acid : 2-glyoxylate amino transferase in plants. Canadian J. Biochem. 43 : 495-506.

Sinha, S.K. and Cossins, E.A. 1964. The metabolism of glycine-C14 by plant tissues. Biochem. J. 93 : 27-34.

Cossins, E.A. and Sinha, S.K. 1964. A comparison of C14 acetate metabolism in germinating fatty seeds. Biochem. Biophys. Acta. 90 : 191-193.

Sinha, S.K. 1964. Response of certain nutrient elements in crop plant in relation to pH as reflected by growth and uptake. Agra Univ. Journal Research (Sci.) 13 : 149.

Sinha, S.K. and Cossins, E.A., 1963. Utilization of radio-sulphate by higher plant tissues. Nature 199 : 1109.

Sinha, S.K. 1962. A simple method of calculating the crossing over the percentage from the F2 data. Current Sci. 31 : 280-281.

Sinha, S.K. and Rao, I.M. 1961. Influence of 2,4-dichlorophenoxy acetic acid on the seedling respiration of maize. Agra Univ. J. Research (Sci.) 10 : 91-98.

Sinha, S.K. 1977. Food Legumes: Distributions, Adaptability & Biology of Yield. FAO, Rome.

Kiladis, G. and Sinha, S.K. 1990. ENSO, Monsoon and Drought in India. In: ENSO Teleconnections Linking Worldwide Climate Anomalies : Scientific Basis and Societal Impact. Eds. M.H. Glantz, R.W. Katz and N. Nicholls. Cambridge University Press.

Sinha, S.K., Kailasanathan, K. and Vasistha, A.K. 1987: Drought management in India: Steps towards eliminating famines. In Planning for drought. Eds. D.A. Wilhite, W.E. Easterling and D.A. Wood. p 453-470. Westview Press. Boulder U.S.A.

Khanna-Chopra, R. & Sinha, S.K. 1987. Chickpea: Physiological Aspects of Crop Yield. In Chickpeas. Eds. M.C. Saxena & K.B. Singh, Commonwealth Agriculture Bureau, London. pp 163-170.

Sinha, S.K., Aggarwal, P.K. and Khanna-Chopra, R. 1984. Irrigation in India: Physiological and phenological approach to water management in grain crops. Advances in Irrigation. Academic Press, 3, 129-212.

Sinha, S.K. & Nicholas, D.J.D. 1981. Nitrate Reductase in Relation to Drought Resistance. In Physiology & Biochemistry of Drought Resistance. Eds. L.G. Paleg & D. Aspinall, Academic Press, Sydney, 145-169.

Sinha, S.K. & Khanna, R. 1975. Physiological, Biochemical & Genetic Basis of Heterosis. Advances Agron. 27, 123-174. Academic Press, New York.

Kumar, S., Patil, B.C. and Sinha, S.K. 1990. Cyanide resistant respiration is involved in raising temperature of ripening mangoes. Biochem. Biophys. Research Commu. 168. 818-822.

Khanna-Chopra, R. and Sinha, S.K. 1988: Enhancement of drought-induced senescence by the reproductive sink in fertile lines of wheat and sorghum. *Ann. Bot.* 61: 649-653.

Koundal, K.R., Khanna, S. and Sinha, S.K. 1987: Relationship of nitrogenase activity to leghaemoglobin and sugar content in nodules of Chickpea, *Cicer arietinum* L. *Indian Jour. Experimental Biology*, 25 785-788.

Aggarwal, P.K. and Sinha, S.K. 1987: Response of droughted wheat to mid-season water application: Recovery in leaf area its effect on grain yield. *Australian J. Plant Physiology*, 14. 227-237.

Sinha, S.K., Aggarwal, P.K., Chaturvedi, G.S., Singh, A.K. and Kailasanathan, K. 1988. Performance of wheat cultivars in a variable soil water environment.I. Grain yield stability. *Field Crop Research* 13, 289-299.

Grover, A., Koundal, K.R. and Sinha, S.K. 1985. Senescence of attached leaves : Regulation by developing pods. *Physiol. Plantarum*. 63, 87-92.

Ajai, Kamat D.S., Chaturvedi, G.S., Singh, A.K. and Sinha, S.K. 1983 Spectral assessment of leaf indexs, chlorophyll content and biomass of chickpeas. *Photo-grammetric Engineering & Remote Sensing*. 49, 1721-1727.

Aggarwal, P.K. & Sinha, S.K. 1983. Water stress and water use efficiency in field growth wheat : A comparison of its efficiency with that of C4 plants. *Agricultural Meteorology*, 29, 159-167.

Sinha, S.K. and Cossins, E.A. 1964. The metabolism of glycine-C14 by plant tissues. *Biochem. J.* 93 : 27-34.

Sinha, S.K. and Cossins, E.A., 1963. Utilization of radio-sulphate by higher plant tissues. *Nature* 199 : 1109.

BIO DATA of Dr.Y.P.ABROL

1. Proposed position: CONSULTANT

2. Name: DR.Y.P. ABROL

3. Date of Birth: December 23, 1935

4. Nationality: Indian

5. Education
(The years in which
various qualifications are
obtained must be stated)

a. B.Sc. Punjab University 1955

b. M.Sc. Banaras Hindu University 1957

c. Ph.D. University of Chicago 1963

6. Other training: Post-doctoral fellow, Department of Biochemistry and Biophysics, University of California, Davis, California

7. Language & Degree of proficiency: English - medium of education

8. Membership of professional societies:
a. Life member, Indian Society of Plant Physiology

b. Life member, Society for Plant Physiology and Biochemistry

c. Full member, Sigma XI

d. Founder Fellow, National Academy of Agricultural Sciences

e. Fellow, National Academy of Sciences, Allahabad

f. Fellow, Indian Academy of Sciences, Bangalore

9. Countries of work experience:

i) USA Higher studies (Feb 1961-July 1965)

ii) England,Germany (East & West) Visited various Institutes; gave an invitational lecture at 'Botanical Institute', Munich (July-Aug 1965)
France,
Switzerland and
Italy

iii) Iran Consultant (FAO), DANIDA Training Course (June 1975).

Y.P. ABROL

10. Employment record

(Starting with present position, list in reversed order every employment held)

Employer	From	To
CSIR: a) Pool Officer	Sept.65 -	June.67 -
ICAR: b) Jr.Plant Physiologist	June,67 -	Nov.68
c) Cereal Physiologist	Nov.68 -	June, 76
d) Sr.Plant Physiologist	July,76-	August 89
e) Principal Scientist & Head,Plant Physiology	Sept.88 -	Uptodate

Present duties: Administrative and Technical control of the Division comprising of about one hundred staff members (Scientific, technical, administrative and supporting staff)

11. Detailed tasks assigned
(list of tasks one by one and support each task by project experience on the right hand side)

a) Plant Physiologist: i) Project Leader, Nitrogen economy of plant growth in relation to nitrogen fertilizer use efficiency;

 ii) Project Leader, Grain quality in mexican dwarf and Indian tall; their suitability for chapati making

b) Principal Investigator & Coordinator: US-India Fund Project: Photosynthesis and plant productivity under tropical environment (1988-1991)

c) Organizing Secretary: Indo-US workshop on 'Global climatic changes - photosynthesis and plant productivity, Jan. 8-12, 91.

d) Principal Investigator: DST funded project on 'Molecular biology of nitrate reductase in higher plants (1990- onwards)

e) Principal Investigator: US-India funded project: UV-B enhancement and CO_2 enrichment effects on crop growth (1991 onwards)

f) Member Committee: 'Climatic changes in relation to agriculture, ICAR, New Delhi

g) Member Committee: 'Climatic changes in relation to agricultural systems', IARI, New Delhi

h) Author: More than one hundred original research articles, several reviews/chapters, edited volumes. Participated in various National/International Conferences.

Y.P.ABROL

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that my willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE:

Y P Abrol (Y P Abrol)

Date of Signing: 27 / 01 / 92
Day Month Year

BIODATA

1. PROPOSED POSITION Impact Specialist

2. NAME JAGANNATHAN VENKATARAMAN

3. DATE OF BIRTH JUNE 15, 1921

4. NATIONALITY INDIAN

5. EDUCATION
(The year in which various qualifications are obtained must be stated) i) Ph.D. (Stanford) 1949
ii) A.I.I.Sc. 1945
iii) B.Sc. (Hons.) 1940

6. OTHER TRAINING

7. LANGUAGE & DEGREE OF PROFICIENCY English, Telugu Read, Write, Speak
Tamil Speak
Sanskrit, German Read

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES Fellow, Indian National Science Academy
Fellow, Indian Academy of Science
Fellow, National Academy of Science
Founder Member, Maharashtra Academy of Science
Past President, Society for Biological Chemists (India)

9. COUNTRIES OF WORK INDIA, U.S.A.

10. EMPLOYMENT RECORD

FROM 1991
TO This date
EMPLOYER Tata Energy Research Institute
POSITION HELD & DESCRIPTION OF DUTIES Head, Biotechnology and Tissue Culture Pilot Plant

FROM 1988
TO 1991
POSITION HELD & DESCRIPTION OF DUTIES Emeritus Head, Biotechnology

FROM 1985
TO 1987
EMPLOYER Tata Energy Research Institute
POSITION HELD & DESCRIPTION OF DUTIES Head, Biotechnology

FROM 1981
 TO 1984
 EMPLOYER National Chemical Laboratory
 POSITION HELD & DESCRIPT- Consultant
 TION OF DUTIES

FROM 1979
 TO 1981
 EMPLOYER National Chemical Laboratory
 POSITION HELD & DESCRIPT- Director's Grade : Distinguished Scientist
 TION OF DUTIES

FROM 1971
 TO 1978
 EMPLOYER National Chemical Laboratory
 POSITION HELD & DESCRIPT- Deputy Director
 TION OF DUTIES

FROM 1957
 TO 1970
 EMPLOYER National Chemical Laboratory
 POSITION HELD & DESCRIPT- Assistant Director and Head,
 TION OF DUTIES Biochemistry Division

FROM 1951
 TO 1957
 EMPLOYER National Chemical Laboratory
 POSITION HELD & DESCRIPT- Senior Scientific Officer
 TION OF DUTIES

FROM 1961
 TO 1962
 EMPLOYER National Institutes of Health, and
 University of Wisconsin, U.S.A.
 POSITION HELD & DESCRIPT- Visiting Scientist
 TION OF DUTIES

FROM 1950
 TO 1951
 EMPLOYER Institute of Enzyme Research,
 University of Wisconsin, U.S.A.
 POSITION HELD & DESCRIPT- US Heart Foundation Fellow
 TION OF DUTIES

11. DETAILED TASKS ASSIGNED
 (List of tasks one by one
 and support each task by
 project experience on the
 right hand side)

12. CERTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

: Jagannath Chatterjee

DATE OF SIGNING :

Third, February, 1992

DAY / MONTH / YEAR

BIODATA

PROPOSED POSITION : Agricultural Impact Specialist

NAME : Anrita N Achanta

DATE OF BIRTH : 19-09-1960

NATIONALITY : Indian

EDUCATION
(The years in which various qualifications are obtained must be stated)

B. Ed (Biology) 1985

MSc (Zoology) 1984

BSc (Hons) Zoology 1982

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English - read, write and speak fluently

Hindi - read and speak fluently

Telugu - read and speak a little

MEMBERSHIP OF PROFESSIONAL SOCIETIES : Full member of Honor Society, Sigma Xi - The Scientific Research Society, (SS)

ASSOCIATION OF INDIAN WOMEN SCIENTISTS

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD :

FROM Nov. 1989 : TO Present

EMPLOYER : Tata Energy Research Institute

POSITION HELD : Research Associate

DESCRIPTION OF DUTIES

Co-coordinator Core Group, Global Warming Centre., research on the likely impact of potential global climate change on Indian agricultural production/Fertilizers use and climate change.

Team member, Environmental Resources Group, Environmental considerations in Energy Development - India.

Member, Project Team on Collaborative Study on Strategies to limit CO₂ emissions

In Asia and Brazil. Asian Energy Institute.

FROM July 1986	:	TO November 1989	
EMPLOYER	:	Gyan Bharati Public School, Delhi	
POSITION HELD	:	Head of Department of Biology	
DESCRIPTION OF DUTIES	:	Taught senior secondary classes - X, XI, and XII	
FROM Nov. 1985	:	TO July 1986	
EMPLOYER	:	National Council of Educational Research and Training, Department of Education in Science and Mathematics	
POSITION HELD	:	Junior Research Fellow	
DESCRIPTION OF DUTIES	:	Worked on a project entitled "Individually Guided System of Instruction (Biology). Development of biology modules for class IX	
FROM Aug 1985	:	TO Sept. 1985	
EMPLOYER	:	Lady Irwin Senior Secondary School, Delhi	
POSITION HELD	:	Honorary Teacher	
DESCRIPTION OF DUTIES	:	Taught senior secondary classes Biology	
DETAILED TASKS ASSIGNED (List of tasks one by one and support each task by project experience on the right hand side)	:	Agriculture Impact Specialist	
PROJECT NAME	LOCATION	YEAR	POSITION HELD
Authored a paper on the impact of Global warming on Indian Agriculture.	New Delhi	1990	
Authored a paper on Estimate of N ₂ O emissions from use of nitrogenous fertilizer in India and Potential for reduction through management practices	New Delhi	1991	

Environmental considerations in Energy Development - India Country study for the ADB.

New Delhi

1991-92

Team Member

Asian Energy Institute.

Team Member - Collaborative study to assess Asia's and Brazil's contribution to Greenhouse gas emission and Policy responses for their minimization.

Coordinated country studies from Iran and South Korea and paper on Technology Transfer

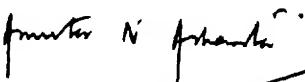
New Delhi

1991

CERTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE .



DATE OF SIGNING : 10/Jan/1992

BIODATA

1. PROPOSED POSITION : Impact Specialist

2. NAME : Dr. Nagarcenkar Ratnakar

3. DATE OF BIRTH : 26.10.1931

4. NATIONALITY : Indian

5. EDUCATION : Ph.D. Animal Genetics and Breeding, University of Poona, 1961.
M.Sc.(Agri.), University of Poona, 1954.
B.Sc.(Agri.), Karnataka University, 1952.

6. OTHER TRAINING : Post-Doctoral Research Fellowship at University of Naples, Italy, 1963.

7. LANGUAGE & DEGREE OF PROFICIENCY : English - Read, Write, Speak
Portuguese - Read
Italian - Read
French - Read
Konkani - Read, Write, Speak
Marathi - Read, Write, Speak
Hindi - Read, Write, Speak

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Life Member, Indian Dairy Association (IDA -- Association of Dairy Professionals publishing two journals - two monthlies (one Scientific)
President of Association, 1988-90.
Presently Member of the Central Executive Committee.

(ii) Life Member and Vice President of Indian Society of Animal Genetics and Breeding.

(iii) Member and Vice President of Indian Society of Buffalo Development.

9. COUNTRIES OF WORK EXPERIENCE : Vietnam, Thailand, Egypt, Bulgaria

↑

10. EMPLOYMENT RECORD :

(i) FROM: Aug. 1991
EMPLOYER : TO: Oct. 1991
: Indian Council of Agricultural
Research

POSITION HELD AND
DESCRIPTION OF DUTIES : Deputy Director General (Animal
Sciences)

(ii) FROM: May 1990
EMPLOYER : TO: Aug. 1991
: Indian Council of Agricultural
Research

POSITION HELD AND
DESCRIPTION OF DUTIES : Deputy Director General
(Education)

(iii) FROM: June 1984
EMPLOYER : TO: May 1991
: Indian Council of Agricultural
Research

POSITION HELD AND
DESCRIPTION OF DUTIES : Director, National Dairy Research
Institute, Karnal

(iv) FROM: May 1982
EMPLOYER : TO: June 1984
: Indian Council of Agricultural
Research

POSITION HELD AND
DESCRIPTION OF DUTIES : Director, Central Sheep and Wool
Research Institute, Avikanagar,
(Malpura), Rajasthan.

(v) FROM: May 1971
EMPLOYER : TO: May 1982
: Indian Council of Agricultural
Research

POSITION HELD AND
DESCRIPTION OF DUTIES : Project Coordinator, All India
Coordinated Research Project on
Buffaloes & Head Division of Dairy
Cattle Genetics and Senior Scientist
(Animal Breeding), National Dairy
Research Institute, Karnal.

(vi) FROM: Apr. 1964
EMPLOYER : TO: May 1971
: Indian Council of Agricultural
Research/Government of India

POSITION HELD AND
DESCRIPTION OF DUTIES : Research Officer (Animal Breeding)
& Animal Geneticist, Southern
Regional Station of National Dairy
Research Institute, Bangalore and at
Karnal.

(vii) FROM: Mar. 1963
EMPLOYER

: TO: Apr. 1964
: Council of Scientific and Industrial
Research.

POSITION HELD AND
DESCRIPTION OF DUTIES

: Pool Officer at Headquarters of
Council of Scientific and Industrial
Research and at National Dairy Research
Institute, Karnal.

(viii) FROM: Dec. 1954
EMPLOYER

: TO: Sep. 1957
: State Government of Bombay

POSITION HELD AND
DESCRIPTION OF DUTIES

: Manager, Sheep Breeding Research
Station, Poona.

. DETAILED TASKS ASSIGNED

: Livestock Expert
(Detailed Biodata attached)

. CERTIFICATION

: I, the undersigned certify that, to
the best of my knowledge and belief,
this biodata correctly describes
myself, my qualifications and my
experience. I understand that any
wilful misstatement described herein
may lead to my disqualification or
dismissal, if employed.

SIGNATURE : *R. Magarwal*

DATE OF SIGNING : 4 - 2 - 1992
DAY MONTH YEAR

BIO-DATA

1. Name & sex : DR. NAGARCENKAR RATNAKAR
(Male)

2. Date of Birth: 26.10.1931

3. Educational Qualifications:

<u>Degree</u>	<u>Year of PaSSING</u>	<u>Subjects</u>	<u>University</u>	<u>College/ Institute . -</u>
B.Sc.(Agri.) Hons.	1952	All Compulsory	Karnataka University	College of Agriculture, Dharwar.
M.Sc.(Agri.)	1954	Animal Husbandry	University of Poona	College of Agriculture, Poona
Ph.D.	1961	Animal Genetics and Breeding	University of Poona	Indian Veterinary Research Institute, Izatnagar(UP)

4. Employment particulars and experience (starting with recent one)

<u>Name of Organisation</u>	<u>Title held</u>	<u>Pay scale & Basic salary p.m. last drawn.</u>	<u>Period</u>
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a) Indian Council of
Agricultural
Research
Deputy
Director
General
(Animal Sciences)
at Hq.

Duties: To advise Director General on Animal Sciences activities to formulate plans and programmes of research work in the field of Animal Sciences for the 8th Five Year Plan period; to monitor the activities of Animal Sciences Institutes, Project Directorates and All India Coordinated Research Projects, bilaterally funded projects and Scientific Panels in Animal Sciences.

b) I.C.A.R. Deputy Director Rs.7600/- (fixed) May 90 to
General(Edn.) Rs.7600/- Aug, 91.

Duties: To advise Director General on matters related to Education in Agricultural Sciences and allied fields; to assist State Agricultural Universities and 4 Deemed to be Universities development, to formulate plans and programmes for maintaining quality of training in U.G. and P.G. fields in Agricultural Sciences.

c) I.C.A.R. Director, National Dairy Research Institute, Karnal Rs.2500-3000 Revised to Rs.7600/- (fixed) Rs.7600/- June 84 to May 91.

Duties: Provided Integrated direction to research, training and transfer of technology activities in Dairy Science; strengthened inter disciplinary and inter-institutional collaboration. Professional association was fostered with National Scientific Panels and developmental agencies (both Govt. and N.G.O.) Reoriented and improved manpower development activities (the Institute was upgraded to the level of Deemed to be University by University Grants Commission & Ministry of H.R.D. as a result of the efforts of the undersigned). Financial and administrative control of the Institute and its two Regional Stations (consisting of 2250 employees) was provided. Innovative programmes like 'Industrial consultancies', 'Farm advisory Bureau' and 'Revolving Fund' were initiated and implemented.

d) I.C.A.R. Director, Central Sheep & Wool Research Instt, Avikanagar, (Malpura) Rajasthan Rs.2000-2500 (Special grade offered to me Rs.2500-3000) Rs.2625/- May 82 to June 84.

Duties: Nation-wide appraisal was conducted on the status of Sheep, goat and rabbit industry. Direction and guidance to the All India Coordinated Research Projects, the Institute and its three regional stations was provided. Collaboration of C.S.I.R. and scientists of Rajasthan Agricultural University (formerly Sukhadia University) was fostered. Appropriate training programmes for rural development activities were organised.

e) I.C.A.R. Project Coordinator, All India Coordinated Research Project on Buffaloes & Head Division of Dairy Cattle Genetics, NDRI and Senior Scientist (Animal Breeding) Rs.1800-2000 & Rs.1800-2250 Rs.2250/- May 71 to May 82.

Duties: Held dual charge of the Head of Division and All India Coordinated Research Project on Buffaloes, both as founder Head and Coordinator. Helped establish the Division and Project from inception. Developed strong school of Post Graduate studies in the subjects of Animal Genetics & Breeding and Livestock Production & Management. Guided 25 P.G. scholars (14 Ph.D. and 11 M.Sc.) in the subjects. Served as ITEC (Min. of Ext. Affairs) expert in Vietnam to conduct survey of Animal Husbandry activities and prepare project proposal to establish Buffalo Research & Training Centre in Vietnam. Notable achievement was on development of two strains of high yielding crossbred cattle christened as 'Karan Swiss' and 'Karan Fries' synthesised through crossbreeding of B. taurus and zebu breeds of dairy cattle.

f) G.O.I./ I.C.A.R. Research Officer Rs.700-1250 April 64 to
(Animal Breeding) Rs.1150/- May 71
& Animal Geneticist
Southern Regional
Station and at
Karnal, N.D.R.I.

Duties: Management of dairy cattle, buffalo and goat farms. Formulation and implementation of breeding policies. Training of U.G. students and farmers. Transfer of Technology through Key village scheme Consultancy and advisory work for farm management including plans for establishment of dairy cattle/buffalo farms.

g) C.S.I.R. Pool Officer Rs.400-700 March 63 to
(at C.S.I.R. Hq. Rs.525/- April 64
and NDRI, Karnal)

Duties: Editorial duties for compilation of a compendium on livestock and Research work in Animal Breeding.

h) **Govt. of Manager, Sheep Rs.80-200 Dec.54 to
Bombay State Breeding Research Rs.95/- Sept 57.
Station, Poona

5. Teaching Experience (at Post-graduate level) - 20 years.

(at Under-graduate level/Farmers) - 30 years.

6. Awards:

- a) ICAR Senior Research Fellowship in 1957-60 for Ph.D. Programme at I.V.R.I., Izatnagar, U.P.
- b) Ministry of Scientific Research & Cultural Affairs (Government of India) - Italian Government fellowship for 15 months for post-doctoral research at University of Naples, Italy (1961-63).

7. Recognitions:

- a) was offered a short term FAO assignment as Consultant in Cattle Breeding in FAO Project BHU/76/001 in Bhutan.
- b) was offered a short term World Bank assignment for Animal Sciences/Dairy Education in Nepal.
- c) was offered World Bank assignment in A.R.E. (State of Minia)
- d) Member, Indian Committee of International Dairy Federation.

**Resigned State Government position to take up higher studies leading to Ph.D. at IVRI, Izatnagar - Oct. 1957 to Jan. 1961 and later post-doctorate studies at Institute of Animal Production, University of Naples, Italy (Oct. 1961 to Jan. 1963).

- e) Research Advisory Board of Bharatiya Agro-Industries Foundation, Poona.
- f) Member, Punjab State Council of Science & Technology, Advisory Board of Bharat Krishak Samaj, National Productivity Council (Dairy Productivity Award Committee).
- g) Member, Editorial Board of Dairy Science Abstracts (Commonwealth Agricultural Bureau International), Editorial Board of I.C.A.R. journals, Editorial Board of Asian Journal of Dairy Science, Editorial Board of Buffalo Research Journal (International Journal from Thailand).
- h) Member, Animal Biotechnology Panel, Department of Biotechnology, Ministry of Science & Technology, Animal Breeding Panel (ICAR), Member of Joint Panel ICAR - NDDDB, Chairman of Sub-Committee on Dairying, Ministry of Health.
- i) Member, Management Committees of NAARM, Hyderabad; G.B. Pant University of Agriculture & Technology, Pantnagar; Academic Councils of four deemed to be Universities — IARI, IVRI, NDRI and CIFE; Board of Management, HPKV, Palampur; Maharashtra State Council of Agricultural Education and Research and Steering Committee of UNDP/UNESCO programme of Educational Technology at NAARM, Hyderabad.
- j) Member, Task Force Committee for establishment of:
 - (1) Central Institute for Research on Buffaloes
 - (2) Central Institute for Research on Goats
 - (3) National Bureau of Animal Genetics and National Institute of Animal Genetics.
- k) Have been Sub-project Coordinator of UNDP assisted projects (1) and (2) and part time of (3).
 - 1. IND/85/020 Centre of Excellence on Animal Biotechnology.
 - 2. IND/78/020 Centre of Excellence on Dairy processing
 - 3. IND/73/020 Centre of Excellence on Dairy Production.
- l) Awarded Science Pioneer Prize by International Buffalo Federation
- m) Official correspondent for Commonwealth Bureau of Animal Genetics and Breeding.
- n) Honorary membership offered of Egyptian Society of Buffalo Development and Egyptian Veterinary and Animal Sciences Society.

Number of Publications:

i)	Research Papers	194
ii)	Technical Papers	25
iii)	Popular articles	53
iv)	Book chapters	2
v)	Book Reviews	4

Membership of Professional Societies:

a) Life Member, Indian Dairy Science Association (IDA — Association of Dairy Professionals publishing two journals - one monthly and one quarterly (Scientific)

President of Association 1988-90.

Presently member of Central Executive Committee.

b) Life Member and Vice President of Indian Society of Animal Genetics and Breeding.

c) Member and Vice President of Indian Society of Buffalo Development

Contribution in the field of Research and Post-graduate teaching.

At NDRI, I have established strong post-graduate programmes for training and research in Animal Genetics and Breeding and Livestock Production and Management. I have trained 25 Post-graduate scholars (14 for Ph.D. and 11 for M.Sc.) as guide and have been on Advisory Committee of number of other scholars in the Department of Dairy Cattle Genetics & Breeding and in other Departments as well. I have assisted in formulation and updating of syllabus for Indian Dairy Diploma, B.Sc. (Dairying), B.Tech.(Dairying), M.Sc. and Ph.D. programmes offered at NDRI. Due to my constant efforts NDRI was conferred the status of Deemed to be University in March 1989. Recently, in October, 1990 I was invited by International Dairy Federation to present a paper on "Dairy Production Education" at Montreal, Canada.

Out of my total of over 34 years of research experience, nearly 25 years have been spent by me at N.D.R.I. in the capacity as Research Officer, founder Project Coordinator for All India Coordinated Research Project on Buffalo, founder Head of Department of Dairy Cattle Genetics & Breeding and later for six years as Director.

I have been very actively associated in synthesizing two breeds of dairy cattle "Karan Swiss" and "Karan Fries" and prepared a programme for continuous selection involving farmers herds. A model programme suitable for progeny testing in small populations and conservation and genetic improvement in Sahiwal cattle has been prepared and implemented by me while at N.D.R.I. These programmes and my research efforts in buffalo and cattle have been highly appreciated world over and FAO/International Agencies invited me as Resource person for consultancy in dairy cattle and in buffalo at Poland, Hissar, Pakistan, Italy, Spain and Malaysia. I was also offered short term assignments by FAO/World Bank.

Languages Known	Read	Write	Speak
1. English	Yes	Yes	Yes
2. Portuguese	Yes	—	—
3. Italian	Yes	—	—
4. French	Yes	—	—
5. Konkani (Mother tongue)	Yes	Yes	Yes
6. Marathi	Yes	Yes	Yes
7. Hindi	Yes	Yes	Yes

Foreign countries visited with date and purpose:

a) Italy, U.K., France & Holland
16 months from October, 1960
to January, 1961. Post doctoral studies in Italy
and visit to Research Institutions
in other countries (one month).

b) Vietnam - three times for one
month each in 1976, 1978 & 1980
As Chairman and Member of
Government of India (ITEC)
expert team. To survey Animal Husbandry
status and prepare documents
for establishment of Buffalo
Research & Training Institute
in Vietnam.

c) Thailand, Mexico, Egypt & Bulgaria As expert under bilateral
1978, 1982, 1980 & 1976 respectively programme.
for one week and four weeks
respectively in case of first
two and last two.

d) Poland (1978) Two weeks As FAO resource person at
International Cattle Breeding
Seminar.

e) U.K. (1989) one week To participate in a Seminar
on Dairy Research on invitation.

f) The Netherlands & Denmark
(1986 and 1989) - one week each To participate in International
Dairy Congress and International
Dairy Federation meetings and
visit important research and
training Institutions.

g) U.K., U.S.A., Switzerland,
Germany, Newzeland, Australia
and Japan (1978, 1986 & 1988)
one month each year. To visit important Universities/
Research Institutions in these
countries.

h) Japan (1989) One week To participate in SABRAO Conference
on invitation by Organisers.

i) Pakistan (1978) one week To participate on invitation in
International Symposium on
Buffalo Reproduction.

I certify that the statement made above are true.

Address: C II/126, Moti Bagh I,
New Delhi (110 021)
Tel. (Residence) 606257

(R. NAGARCENKAR)
Signature

BIODATA

1. PROPOSED POSITION : Impact Specialist

2. NAME : Atul Kansal

3. DATE OF BIRTH : 04 January, 1966

4. NATIONALITY : Indian

5. EDUCATION : (i) M.E. (Industrial Pollution Abatement)
University of Roorkee 1990
(ii) B.E. (Civil Engg.)
Birla Inst. of Technology 1988
Ranchi

6. OTHER TRAINING : Air Pollution Control in Industries,
March 5-16, 1991. Organised by Chemical
Engineering Deptt., University of
Roorkee, Roorkee, U.P.

7. LANGUAGE & DEGREE OF PROFICIENCY : (i) English: read, write & speak fluent
(ii) Hindi: read, write & speak fluently

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Indian Association of Environmental Management
(ii) Bio-energy Society of India
(iii) Institution of Engineers, India
(iv) World Wildlife Fund for Nature
(v) Indian National Trust for Art and Cultural Heritage (INTACH)

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :
(i) From: 10/90 To: present
Employer: Tata Energy Research Institute, New Delhi

Post held: Research Associate

Description of duties: Activities include:

- Study of environmental impacts of global warming
- Study of environmental impacts of thermal and hydropower generation
- Bio-energy generation from sewage sludge and other industrial wastes
- Study of environmental control measures in coal mining and their costing
- Assessment of energy demand of slum areas in Delhi
- Environmental auditing
- Writing of research proposals and technical reports.

(ii) From: 3/90 To: 9/90
Employer: University of Roorkee

Post held: Member of Air Pollution Monitoring team.

11. DETAILED TASKS ASSIGNED : Impact Specialist

12. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : 
DATE OF SIGNING : 28 / 01 / 1992
DAY MONTH YEAR

BIODATA

PROPOSED POSITION : Fishery Specialist

NAME : Padmakar V Dehdrai

DATE OF BIRTH : 21 December 1938

NATIONALITY : Indian

EDUCATION : (The years in which various qualifications are obtained must be stated)

(i) NRCC - Post Doctorate with Fisheries Research Board of Canada

(ii) CSIR Post-Doctorate Research

(iii) Ph.D (Physiology)

(iv) M.Sc (Zoology)

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English

MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Fellow of Zoological Society, India

(ii) President, Society of Environmentalist, Madhya Pradesh

(iii) Member, Inland Fisheries Society of India

(iv) Member, Asian Fisheries Society

(v) Fellow, National Academy of Sciences, India

(vi) Fellow, National Academy of Agricultural Sciences, India

COUNTRIES OF WORK EXPERIENCE : (i) India

(ii) U.S.A.

(iii) Canada

I. EMPLOYMENT RECORD : (starting with present position. List in reserved order (every employment held))

FROM 1986 : TO Present

EMPLOYER : Indian Council of Agricultural Rese
New Delhi

POSITION HELD : Deputy Director General (Fisheries)

FROM 1981 : TO 1986

EMPLOYER : Ministry of Agriculture, New Delhi

POSITION HELD : Fisheries Development Commissioner

FROM 1971 : TO 1981

EMPLOYER : Central Island Fisheries Research
Institute, Barakpore

POSITION HELD : Project Coordinator

FROM 1959 : TO 1981

EMPLOYER : National Institute of Oceanography
(CSIR), Goa.

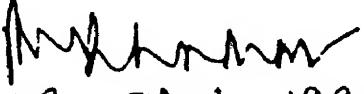
POSITION HELD : Scientist

DETAILED TASKS ASSIGNED : Fisheries Specialist

(List of tasks one by one and support each task by project experience on the right hand side)

: (List project name, location, year, position held, i.e. Team Leader, Hydrologist, Agricultural Economist, etc. exact duties rendered and time spent on each project)

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : 
DATE OF SIGNING : 28 / JAN / 1992
DAY MONTH YEAR

bio - data

1. NAME : PADMAKAR V. DEHADRAJ
2. FATHER'S NAME : (Late) Dr. VISHVANATH S. DEHADRAJ.
3. DATE OF BIRTH : 21st DECEMBER, 1938.
4. Present Address :

Deputy Director General
(Fisheries)
Indian Council of Agricultural
Research,
Ministry of Agriculture,
Room No. 103, Krishi Bhawan,
New Delhi - 110 001.
[Phone : 382713]

Residence

DI/142, Satya Marg,
Chanakyapuri,
New Delhi - 110 021.
[Phone : 672385]

5. EDUCATION : M.Sc. (Zoology) Saugar University
M.Phil. (Zoology) Delhi University
CSIR Post-Doctorate Research
at Delhi University/Patel Chest
Institute.
NRCC - Post Doctorate with
Fisheries Research Board of
Canada.

6. AWARDS : Rafi Ahmed Kidwai Memorial
Prize - 1976.
- Fellow of Zoological Society, India
- President, Society of Environmentalist, Madhya Pradesh.
- Member, Inland Fisheries Society of India.
- Member, Asian Fisheries Society.
- F.R.S., National Academy Sciences, India.
- Fellow, National Academy of Agricultural Sciences, India.
Contd.....

7. **POSTS HELD**

- Scientist, National Institute of Oceanography (CSIR) Goa.
- Project Co-ordinator, CIFRI (ICAR)
- Fisheries Development Commissioner, Government of India.
- Deputy Director General (Fisheries), Indian Council of Agricultural Research.

8. **Educational and professional qualifications and training if any -**

- 8.1 M.Sc. in Zoology with Fish and Fishery as specialisation from Saugar University.
- 8.2 Ph.D. on Functional anatomy and physiology of fishes, Delhi University.
- 8.3 Post doctorate Research in respiratory physiology of air-breathing fishes at Delhi University from 1961 to 1963.
- 8.4 National Research Council of Canada's Post doctorate Research Fellowship and attached to the Fisheries Research Board of Canada, St. Andrews, N.B., 1964-1966.

9. **EXPERIENCE**

Research :

1959-1981 : In limnology, estuarine and marine ecology; biology and physiology/behaviour of freshwater/marine fishes; productivity of rivers and estuaries and oceanic waters; inland aquaculture.

Organisational, Co-ordination :

1971-1981 : as Project Co-ordinator of ICAR at Central Island Fisheries Research Institute, Barrackpore.

Administration and Policy Planning :

1981-1986 : as Fisheries Development Commissioner, Ministry of Agriculture, New Delhi.

1986 : as Deputy Director General (Fisheries) at Indian Council of Agricultural Research, New Delhi.

11. DELHI UNIVERSITY, INDIA

10.1 Worked on a research project on 'Problems of Fish Culture in Delhi State' sponsored by the CSIR in the Delhi University as a Junior Research Fellow from May 1958 to October 1961.

Contd.....

The work involved the study of food and feeding habits of carps in relation to plankton ecology and limnology of ponds. A general survey of 98 ponds and small lakes was done to assess the scope of active fish culture in the Delhi University. The reports were submitted to the CSIR India.

10.2 Held Post-doctorate research fellowship of CSIR India in the Delhi University from October 1961 to March 1963 and worked on the respiratory physiology and behaviour of air-breathing fishes and the so called 'diving reflexes' in air-breathing teleosts.

11. AT JABALPUR UNIVERSITY, MADHYA PRADESH, INDIA

11.1 Selected to Scientists Pool of India (CSIR) and was attached to the Government Science College of the Jabalpur University from March 1963 to September, 1964, during which taught systematics and physiology of fishes to the post-graduate classes of Zoology.

11.2 Conducted a research project sponsored by CSIR on thyroid in relation to aerial respiration in teleosts.

11.3 Worked on limnology of Budhwara Tank at Seoni (Madhya Pradesh) in relation to the sewage disposal in the tanks and high production of carps per acre.

12. AT FISHERIES RESEARCH BOARD OF CANADA, ST. ANDREWS N.B.

12.1 Awarded Post-doctoral Research Fellowship of the National research Council of Canada and was attached to the St. Andrews Biological Station of the Fisheries Research Board of Canada from November 1964 to February 1966. During the stay the work concerned:

12.2 Histochemical investigations on Exophthalmia in the Atlantic cod Gadus marinus.

12.3 Respiration of Atlantic salmon Salmo salar under various salinities of the ambient water at 5°C and 15°C in relation to routine metabolism, percentage utilization of oxygen, rate of flow of water over the gills, gill area in relation to size composition of fishes.

12.4 Structural differences in the kidney of salmon acclimated to different salinities.

12.5 Freezing point of urine of Salmo salar at various salinity acclimatations.

Contd....

12.6 Participation in Salmon tagging programme of the Fisheries Research Board of Canada at Miramichi Estuary during summer 1965.

12.7 Participated in high sea fishery cruises from Canada to Greenland.

13. AT NATIONAL INSTITUTE OF OCEANOGRAPHY, PANJIM, GOA, INDIA

13.1 Joined National Institute of Oceanography as a Pool Officer (again in April 1966 temporarily at New Delhi). Later transferred to Goa in April 1967 and appointed as a Senior Scientific Officer in the Institute at Panjim in February, 1968.

13.2 Duties concerned administration and organisation for the establishment of National Institute of Oceanography at Goa.

13.3 Initiated Institute's programme on Biological Oceanography and organised Biological Oceanography Division of NIO.

13.4 Research assignment on hydrography and biological productivity of the estuarine environment and the coastal waters of the Arabian sea. The work also formed the commitment to IBP on marine productivity.

13.5 Observations on the activity in relation to tidal and diurnal rhythm in the marine air-breathing fish Periophthalmus.

13.6 Attended the All India Symposium on Estuarine Ecology held at Madras, 1970.

14. AT CENTRAL INLAND FISHERIES RESEARCH INSTITUTE (ICAR), BARRACKPORE, INDIA.

14.1 Joined as a Project Co-ordinator of the All India Co-ordinated Research Project in propagation of Air-breathing fishes in swamps sponsored by Indian Council of Agricultural Research at the Central Inland Fisheries Research Institute with Sub centres, in Assam, Bihar, West Bengal, Andhra Pradesh and Karnataka.

14.2 Under my leadership all efforts were directed to convert the hitherto capture fishery of air-breathing fishes into a controlled culture fishery and within five years a totally new kind of culture system of air-breathing fishes suited to utilise shallow, seasonal derelict ponds in rural and suburban areas has been developed. Successful demonstrations of production of Clarias batrachus and murels in open ponds have established the system as a low input high yielding technology (letters from Secretaries and Directors of State Fisheries enclosed). Culture of murels with supplementary feeding in itself is a major achievement.

14.3 Derelict water bodies of manageable sizes whose carrying capacity is generally high were found to be suitable for mixed culture and compatible species of air-breathing fishes. In Bihar mixed culture of Heteropneustes, Clarias and Anabas yielded a production of 1,200 kg/ha/7 months along with the aquatic cash crop Makhana (Euryale ferox). This has shown an effective way to enhance income from semi swamps through fish culture. In Karnataka State the production of murrels to the tune of 4,041 kg/ha/8m could be achieved. Stocking of O. m. marilius @ 10,000 nos./ha and fed on low grade dried marine trash fish yielded a production of 3,059 kg/ha/8 months.

14.4 In West Bengal (Kalyani), 10 gm (av. wt.) Clarias stocked at the rate of 40,000 numbers per hectare and fed on cheaply available low grade dried marine trash fish and rice bran mixture indicated the assessed production of more than 5,000 kg/ha/5 months. Again in a sewage fed pond (0.076 ha) at Khardeh (West Bengal) Clarias (3,000 nos./ha) and Tilapia (26,000 nos./ha) yielded an actual production at the rate of 580 kg/ha mogur and 2,315 kg/ha. Tilapia in 100 days.

14.5 Clarias when cultured in a pond of 0.05 ha as an additional component with carps and stocked at the rate of 2,000 nos. per hectare, the production of Clarias alone was to the tune 1200 kg/ha per 4 $\frac{1}{2}$ months and contributed 55% of the total income from the pond.

14.6 Cage culture of Singhi (Heteropneustes fossilis) with a production potential of 9 kg/sq meter/200 days with low input has facilitated handling of the difficult fish in culture operations.

14.7 Detailed studies on ecology of swamps through their various phases of dereliction in North Bihar have been made.

14.8 Studies on food and feeding habits, growth, maturity, fecundity and spawning of Anabas, Heteropneustes, Clarias and three commercially important species of murrels have been done.

14.9 Discovery of NPN assimilation by Clarias batrachus and Heteropneustes fossilis is unique in the annals of animal physiology. This will help in drastic reduction of the operational cost in mogur and singhi culture and has national and international implications.

14.10 Induced breeding of Anabas, Heteropneustes and Clarias has been standardised. Sexual dimorphism in murrel identified via O. m. marilius, O. striatus and O. punctatus induced bred for the first time to produce stockable material on large scale. Technique to induce breed Clarias in controlled paddy fields avoiding

Contd.....

expenditure on hapas and ponds has been developed and demonstrated in Bihar and West Bengal. Stockable material of air-breathing fishes was produced in abundance in Assam, Bihar, Karnataka and West Bengal and sizeable quantity gifted to Meghalaya also during 1974, 1975 and 1976. Techniques tested for successful rearing of spawn of air-breathing fishes with high percentage of survival.

- 14.11 A specially designed Magur breeding farm, first of its kind, was established at Amranga in Assam with NEC assistance.
- 14.12 Cage culture of air-breathing fishes being adapted by NEC, Shillong in hill states to utilise weed infested waters.
- 14.13 Cooperative Societies in West Bengal adapted magur culture by converting sizeable water areas for the purpose. Bidhan Chandra Krishi Vishwa Vidyalaya has voluntarily adapted under their extension programme, the propagation of magur culture.
- 14.14 CIFRI/IDRC Rural Aquaculture Project included magur and singhi culture in their extension programme in West Bengal.
- 14.15 Intensive culture of Magur with a yield of 55 tonnes/ha/5 months was demonstrated in farmers' ponds at Delhi near Khanpur during 1977-78.
- 14.16 Looked after the Institute in the absence of the Director from time to time.
- 14.17 Provided Scientific support to many schemes outside the Project/ Institute and guided research activities of colleagues.
- 14.18 Co-ordinated the Project activities and managed research and technique development programmes at various centres of the Project.
- 14.19 A three minutes T.V. Film on Clarias culture was directed for Calcutta Doordarshan. The film was prepared for National Programme.

15. AT THE MINISTRY OF AGRICULTURE, GOVT. OF INDIA

- 15.1 Selected through UPSC - joined as Fisheries Development Commissioner, Govt. of India in the Ministry of agriculture, New Delhi on deputation for five years from November 9, 1981 to November 7, 1986. During the period I have had total involvement in policy phasing, program formulation, implementation and monitoring in regard to overall fishery development in India.

Contd....

- 15.2 Streamlined the marine fisheries development schemes for fast approvals and implementation.
- 15.3 Revised the charter policy for implementation to achieve upto 93 vessels operation in Indian EEZ upto March, 1984.
- 15.4 Rules under the Maritime Zones of India Act, 1981 were formulated and got passed.
- 15.5 Harbour construction programs were reviewed for implementation identifying priority states.
- 15.6 The Govt. of India institutes, Fishery Survey of India, Central Institute of Coastal Engineering Fishery, Integrated Fishery Project and Central Institute of Fishery Nautical & Engineering Training were reviewed, re-organised and strengthened.
- 15.7 World Bank assisted Inland Fisheries Programmes were reviewed and Hatchery construction modified. Extension of the program negotiated with World Bank.
- 15.8 New Schemes on National Fish Seed Production, Brackishwater Fish/Prawn Farming, Inland Fishery Statistics, Group Accident Insurance, and Techno-Socio-economic survey of fishermen community, National Welfare Fund were initiated and implemented.
- 15.9 Seventh Plan strategies formulated as Secretary of the National Working Group.
- 15.10 Bilateral Projects with NORAD, ODA, DANIDA, EEC and Japanese Aid negotiated and implemented successfully.
- 15.11 Held the total responsibility of the Fisheries Division on technical matters and advised the Government on various issues including Parliamentary work, organisation, administration, budget and personnel management setting the trend for planned and faster development.
- 15.12 Formulated policies and regulations for building a deepsea fishing fleet of 500 resource specific vessels for implementation.

16. AT THE ICAR HEADQUARTERS, NEW DELHI

16.1 From ICAR as Assistant Director General (Fy) after re-arrangement from the Ministry of Agriculture in November, 1986 and took over charge of Deputy Director General (Fy) Selected as Deputy Director General (Fy) on regular basis in September, 1987.

Contd....

16.2 Member, Board of Directors of Orissa Shrimp Hatchery Society and Andhra Pradesh Shrimp Hatchery Society.

16.3 Member, Fishing vessel Aquisition and Licensing Committee (Interministerial) of Ministry of Agriculture.

16.4 Member, ACCOTS Board of NABARD.

16.5 Member, Policy Planning Committee of ICAR.

16.6 Member, Marine Research Development Fund Committee of Department of Ocean Development.

16.7 Member, Management Committee and Executive Committee of Mahatma Phule Agricultural University, Rahuri, Maharashtra.

16.8 Chairman, National Productivity Council Award Committee (Fisheries), 1986, 1987.

16.9 Member, Organising Committee for Workshop on Antarctica Studies by CSIR/DOD at New Delhi in May 3-5, 1988.

16.10 Member Secretary - Sub-Committee on Fisheries of Ocean Science & Technology Board, Government of India.

16.11 Jury Member - Bhasin Foundation Award Committee, 1986.

16.12 Member delegate, Technical Committee on Agriculture, SAARC for May 1987 and May, 1988.

16.13 Formulated and finalised fisheries syllabus for Rajendra Agricultural University, Bihar.

16.14 Established a Central School at the Mandapam Campus of CMFRI through the Central Board of Education.

16.15 Negotiated and obtained UGC approval to the deemed to be university status to GEF - Bombay.

16.16 Evaluated fisheries projects of voluntary Agencies for funding by CAPART.

16.17 Implemented re-organisation of the 8 Fisheries Research/Education Institutes under ICAR for re-orienting research, personnel re-deployment, provision of infrastructure, linkages with other relevant agencies/organizations both in India and abroad and new projects for funding.

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17. SPECIAL ASSIGNMENTS

- 17.1 Member, Task Force Panel of Fisheries for Integrated Rural Development Project, Chandrapur, Maharashtra under PKV, Akola. Surveyed Chandrapur District and formulated a detailed project on research, development and extension of fisheries in the area.
- 17.2 Member, Bihar Development Board for formulation of schemes on Fisheries Development and extension. Attended three meetings at Darbhanga and Patna and drafted the chapter on Fisheries.
- 17.3 Member, Indian Standard Institute Committee on Standardisation of Sewage disposal in surf zone and estuaries (Committee Code 26 : 1 : 3 ISI) since 1975. Reviewed standardisation of instruments for water management.
- 17.4 Organised Workshops of the Co-ordinated Project on Air-breathing fish culture at Cuttack (1971), Patna (1972) and Bangalore (1976).
- 17.5 Organised three Summer Institutes as Associate Director at CIFRI, Barrackpore in 1974, 1975 and 1976. Conducted the teaching/training/tests/field programmes for the Summer Institutes.
- 17.6 External examiner for M.Sc and Ph.D. thesis of Madurai University, Bihar University, Calcutta University and Bhopal University, Shantiniketan, Aligarh University, Agra University, Raipur University, Magadh University, Karnataka University, etc.
- 17.7 Member, Management Committee of CIFRI for the term 1975-78.
- 17.8 Chairman, Research Council, Ancillary Projects of CIFRI, Barrackpore.
- 17.9 External Expert, Bengal Public Service Commission, Calcutta for selecting Fisheries Officers.
- 17.10 Advisor, Syllabus Committee, School of Studies in Biosciences, Bhopal University during 1975-78. Finalised the syllabus on inland aquaculture for M.Sc. degree of Bhopal University.
- 17.11 Deputed on observation tour of seven weeks to Singapore, Malaysia, Indonesia, Philippines, Thailand to study aquaculture development in South East Asian Countries during September - October, 1977.
- 17.12 Member, Executive Council, Zoological Society of India.

Contd.....

17.13 Deputed by ICAR to participate in the SEAFDEC Workshop on strategies for Aquaculture Development in South East Asia at Manila, Philippines during September, 1978. Participated as a Member of Indian Team.

17.14 Member of Central Teams to assess floods and draught in various states from 1983 to 1986.

18. SPECIAL INVITATIONS

18.1 Invited as Principal Speaker on "Environment and Ecology of Air-breathing fishes" in International Physiological Congress in India in October, 1974. The contribution published as a Chapter in the review Book on "Respiration of Amphibious Vertebrates" Ed. G.M. Hughes, Acad, Press Inc. Ltd. London.

18.2 Invited as a Panel Member of the Session III on Utilisation of Swamps and marshes of the IPFC Symposium under its XVII Session held at Colombo, Sri Lanka during October, 1976. Successfully got a resolution passed on adaptation of air-breathing fish culture as low input high yielding technology in Indi-Pacific and African countries.

18.3 Invitation received to be Resource Speaker in the FAO/SIDA International Workshop on Aquatic pollution in relation to Fisheries Resources held at Manila, Philippines in February, 1977. Invited to deliver a series of three lectures in inland aquaculture, Role of organic waste in fish culture and Pollution in Aquaculture.

18.4 Invited under UGC Extension Lectures series to Bhopal University to deliver lecture on air-breathing fish culture and sewage fed fisheries.

18.5 Invited Speaker in the All India Training Programme on Environmental Pollution organised by NEERI, Nagpur and Biochemical Society of India, Calcutta during 1975 and 1976.

18.6 Invitation received to deliver III Professor H.K. Mukherjee Memorial Lecture at Calcutta University, in 1977.

18.7 Invited to present a paper in Seminar on Development of Inland Aquaculture in Tamil Nadu held at Coimbatore in September, 1974.

18.8 Elected Fellow of the Zoological Society of India and invited to attend the IV Zoological Congress at Gaya during October, 1978.

Contd.....

18.9 As Fisheries Development Commissioner, invited to a number of Seminars, Symposia, Workshops both national and international.

18.10 As Deputy Director General (Fy) in Indian Council of Agricultural Research, chaired Several session in national level seminars and workshops.

18.11 Overall in-charge of the stores equipment and vehicles of the CIFRI at Barrackpore during 1974-77.

18.12 Director in-charge, CIFRI, Barrackpore from September 24, 1975 to December 20, 1975.

18.13 Looked after the Institute in the absence of the Director from time to time when he was on foreign assignments as well as during his routine tours.

18.14 As Fisheries Development Commissioner, a number of assignments were given both in Government and quasi-government sectors to head or support various Committees, task forces and panels.

19. FOREIGN VISITS

Country	Date	Duration	Purpose
1. Canada	October'64 to February'66.	1½ years	NRCC Post-doctorate Research with FRBC
2. U.S.A.	1965	2 months	Working at woodshole and tourism.
3. England, France Switzerland, Italy, Greece and Egypt.	1966	3 months	Visiting Institutes and Laboratories.
4. Sri Lanka	October'76	19 days	Panel member, XVII, IPFC Session.
5. Philippines Hongkong	February'77	9 days	FAO/SIDA Workshop as resource speaker.

Concl....

Country	Date	Duration	Purpose
6. Singapore, Malaysia, Indonesia, Philippines, Thailand.	September- October, 1977	2 months	Observational tour to South East Asia sponsored by IDRC
7. Philippines	September, '78	10 days	Member of Indian team to attend SEAFDEC Workshop on Strategies Aquaculture Development in South East Asia.
8. Sydney Australia	April, 1982	7 days	IPFC Standing Committee Research and Development
9. Sri Lanka	July, 1982	3 days	Meeting of Group of Experts in Fisheries - NAM Countries.
10. Manila Philippines	February, 1984.	4 days	Regional Workshop on Carp Hatchery - and Nursery Technology - ADB/CLARM
11. Jakarta Indonesia	August, 1984	7 days	Fourth Session of SCORRAD
12. Bangkok, Thailand	February - March, 1985.	6 days	BOBC meeting and 9th Session of Advisory Committee on BOBP.
13. Oslo, Bergen Norway	May 5-9, 1986	5 days	CODEX Alimentarius Commission meeting - 17th Session.
14. Bangkok Thailand	June 18-27, 1986	10 days	3rd Session of Inland Fisheries Working Party of IPFC, Symposium on Mangroves.
15. The Netherlands	October, 1986	10 days	Ministerial delegation to discuss mutual collaboration in deep sea fisheries - post harvest.

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Country	Date	Duration	Purpose
16. Thailand	July 22-25 1987	2 days	To attend CCGIAR/FAO Meeting on establishment of Global Aquaculture Institute.
17. Kathmandu	December 1-5, 1987	5 days	SAARC Meeting on Aquaculture.
18. Thailand (Ubon)	March 20-25, 1988	8 days	IRRI/ADB Workplan on Rice Fish Farming.
19. UK/France	Sept. 10, 1988 to Oct. 17, 1988	21 days	Lead Indian Delegation for Indo-UK Technical Coopn. Project and Indo-INRA Bilateral Programme.
20. France	Sept. 11-16, 1989.	6 days	Technical Session on Fishing and Food Processing.
21. Bangladesh	March 19-22, 1990.	4 days	Lead Indian Delegation to Bangladesh for Jt. Session to review the ICAR-BARC Cooperation.
22. South Korea	Oct. 8-15, 1990	8 days	To attend the International Workshop on Fish Health Management in Asia and Pacific sponsored by Asian Development Bank and NACA.
23. Thailand	Jan. 9-18, 1991	10 days	To attend Governing Council of NACA and Sea-Farming Project.
24. Manila	Feb. 26-28, 1991	3 days	To attend ICLARM Strategic Planning and Plenary Meeting of CCGIAR.
25. The Land & March 11-21, Philippines 1991	11 days	Concurrent study tour on FAO/ROBPP.	
26. Thailand	November 5-14, 1991	10 days	Attended the 5th National Coordinators Meeting and the Terminal Tripartite Review Meeting of the Regional Sea Farming Development and Demonstration Project as also the 3rd Meeting of the NACA Governing Council.
27. Cuba	Nov.23, 1991 to Dec. 4, 1991.	12 days	For finalising the Indo-Cuban 2nd Biennial Workplan for 1992-1993 for cooperation in the field of Agricultural Research and Education.

LIST OF PUBLICATIONS

1. Dehadrai, P.V. 1957 On the swimbladder and its relation with the internal ear in genus Notopterus (Lacepede) J. Zool. Soc. India. 9 : 50 - 61.
2. Dehadrai, P.V. 1959 On the swimbladder and its connection with the internal ear in family Cichidae. Proc. Nat. Inst. Sci. India. 25 B : 254 - 261.
3. Dehadrai, P.V. 1960 Respiratory function of the swimbladder of Notopterus (Lacepede) Nature London 185 : 929.
4. Dehadrai, P.V. 1960 On the swimbladder and its posterior communication with the exterior in an Indian Culapeioid Ilisha indica. Copeia : 125 - 130.
5. Dehadrai, P.V. 1962 Respiratory function of the swimbladder of Notopterus (Lacepede) Proc. Zool. Soc. London 139 : 341 - 357.
6. Dehadrai, P.V. 1962 Studies on the swimbladder of certain marine Clupeids, Proc. Nat. Inst. Sci. India. 28 B : 115 - 132.
7. Dehadrai, P.V. 1962 Observations on certain physiological reactions in Ophicephalus striatus exposed to air Life Sciences, Pergamon Press Inc., No. 11 : 653 - 657.
8. Dehadrai, P.V. 1962 Mechanism of gaseous exophthalmia in the Atlantic Cod, Gadus morhua L. J. Fish Res. Bd. Canada 23(6) : 909 - 914.
9. Dehadrai, P.V. 1972 Thyroid in relation to aerial respiration in Notopterus notopterus Ham. J. Biol. Sci. 14 (2).

Contd.....

10. Dehadrai, P.V. 1972 Experimental and pharmacological studies on the gas secretion in Ophicephalus and Culisa. I. Biol. Sci. 15 (1,2) : 56 - 63.

11. Dehadrai, P.V. 1970 Observations on certain environmental features at the Dona Paula point in Normugao Bay, Goa. Proc, Indian Acad. Sci., 72 : 56 - 67.

12. Dehadrai, P.V. 1970 Changes in the environmental features of the Zuari and Mandovi estuaries in relation to tides. Proc. Indian Acad. Sci. 72 : 68-80.

13. Dehadrai, P.V. In Press Modifications of the auditory bulla and the swimbladder in family Belonidae-systematic significance, Copeia.

14. Dehadrai, P.V. 1971 Estuarine Heritage of Goa. Goa Today February, 1971.

15. Dehadrai, P.V. 1971 Food production from Goa Estuaries Sea Food Journal 3(8) : 21-23.

16. Dehadrai, P.V. 1971 Utilisation of swamps for culture of air-breathing fishes. CIFRI, Silver Jubilee Brochure, 1972.

17. Dehadrai, P.V. 1971 Physiological adaptations of air-breathing fishes, ICAR Workshop, Cuttac, 1971.

18. Dehadrai, P.V. and R.M.S. Bhargava 1972 Seasonal organic production in relation to environmental features in Mandovi and Zuari estuaries., Goa Indian J. Mar. Biol. (CSIR) 1(1) : 52 - 56.

19. Dehadrai, P.V. and R.M.S. Bhargava 1972 Seasonal variations of chlorophyll pigments and phylo-plankton along the Central West Coast of India (15°, 3'N-18°-30'N) Mar Biol. 17(1) : 30-37.

20. IBP Report (P.M.) - India 1972 Studies on primary productivity of Estuarine and coastal region Goa, India

21. Dehadrai, P.V. and H.A. Khan 1972, Present status of live fish fishery in India. Interim Report Not Comm. Agri. New Delhi.

Contd.....

Dehadrai, P.V. et al., 1972 Sexual dimorphism in air-breathing fishes. J. Indian Fish. Soc. 5: 71-77.

Dehadrai, P.V. et al., 1973 Settlement of fouling organisms of fibre glass coated hull of a boat in estuarine environment. Bombay Nat. Hist. Soc. 72: 580.

Dehadrai, P.V. S.R. Banerjee 1973 Culture of Air-breathing fishes in India. Farmer's Digest, U.P. Agriculture University. 6(1) : 41.

Dehadrai, P.V. and S.R. Banerjee 1973 Capacity of Anabas to feed on insect. J. Indian Fish. Sci. 5:137-140.

Jhingran, V.C., and P.V. Dehadrai 1973 Inland Fisheries of the North Eastern Region of India. ICAR Seminar on Res. & Training needs in Agriculture & Animal Husb. of North Eastern Region. Shillong

Dehadrai, P.V. N.K. Das and N.K. Thakur (In Press). Rearing and survival of induced bred spawn of Heteropneustes fossilis. J. Inland Fish. Soc.

Dehadrai, P.V. N.K. Thakur and N.K. Das. 1974. Environmental features of a swamp in North Bihar in relation to the production of 'Makhana' (Euryale ferox) and air-breathing fishes. IBP Symposium on productivity, Delhi.

Dehadrai, P.V. and S. Parameswaran, 1974. Utilisation of swamps and marshes for culture of air-breathing fishes. Symposium on Development of Inland Fisheries in Tamil Nadu, Coimbatore, India.

Dehadrai, P.V. 1975 Derelict waters for air-breathing fish culture. Indian Farming 25(6), 19-20.

Dehadrai, P.V. et al. 1975 Trends in Murrel Fisheries in Malnad region of Karnataka State. Third All India Congress of Zoology, Solapur, India 1975.

Dehadrai, P.V. et al., 1975 Investigations on culture of murrels in swamps in Karnataka. Third All India Congress of Zoology, Solapur, India. 1975.

Dehadrai, P.V. et al., 1975 Observations on cage culture of air-breathing fishes in swamps of Assam. J. Inland Fish. Soc. India 6: 89-92.

Contd.....

34. Dehadrai, P.V. Short term culture of air-breathing fishes in shallow ponds. Indian Farmers' Digest 13(1):24-26.

35. Dehadrai, P.V. and S.D. Tripathi 1976 Environment and Ecology of Freshwater Air-breathing Teleosts. Respiration of Amphibious Vertebrates Ed. G.M. Hughes Acad. Press. Inc. (London) Ltd. pp. 39-72 (A Chapter).

36. Mukhopadhyay, P.K. S.K. Banerjee, P.V. Dehadrai and H.N. Dutta 1976 Comparative toxicities of cadmium on the gills of air-breathing and non air-breathing fishes. Indian J. Biochem. Biophys. 13:43.

37. Mukhopadhyay, P.K. S.K. Banerjee and P.V. Dehadrai 1977. Biochemical effects of organophosphorus insecticides in fishes. Indian J. Biochem. Biophys. 14 (1) : 57.

38. Dehadrai, P.V. R.N. Pal 1977 Aquaculture Techniques. FAO/SIDA Workshop on Aquatic Pollution in relation to protection of living resources, Manila, Philippines.

39. Dehadrai, P.V. 1977 Pollution in Aquaculture. FAO/SIDA Workshop on Aquatic Pollution in relation to protection of living resources, Manila, Philippines.

40. Dehadrai, P.V. et al., 1977 Efficacy of different feeds in survival of spawn of Anableps testudineus (Block) J. Inland Soc. India 9 : 165-167.

41. Dehadrai, P.V. et al., 1977 A new record of a bacterium causing eye disease and mortality in Channa maculatus (Ham.) J. Inland Soc. India 9 : 214-216.

42. Mukhopadhyay, P.K. , S.K. Banerjee & P.V. Dehadrai 1977 Biochemical and pathobiological studies on the toxicity of malathion in the air-breathing fish, Clarias batrachus (Linn.) Proc. First All India Symp. Metabolism & Disposition Xenobiotics, Marathwada University, Aurangabad.

43. Banerjee, S.K., P.K. Mukhopadhyay and P.V. Dehadrai, 1977 Studies of environmental pollutants on fishes First International Symposium on Environmental Pollutants : Animal Models and Wildlife as Monitors, June 1-3, 1977, University of Connecticut, Storrs, USA Proc. Natl. Acad. Sci. USA.

44. Dehadrai, P.V. and Apurba Ghosh 1977 Recycling of organic waste in aquaculture. FAO/SIDA Workshop on Aquatic Pollution in relation to protection of living resources at Manila, Philippines.

Contd....

45. S.K. Banerjee, S. S. Ghosh Dastidar, P.K. Mukhopadhyay & P.V. Dehadrai, 1978. Toxicity of Cadmium - A comparative study in the Air-breathing Fish, Clarias batrachus (Linn.) and in the Non-Air-breathing one, Tilapia mossambica (Peters). Indian J. Exp. Biol. 16:1274-1277.

46. Mukhopadhyay, P.K., P.V. Dehadrai and S.K. Banerjee 1978. Studies on intestinal protease : Isolation, purification and effect of dietary protein levels on alkaline protease activity from the air-breathing fish, Clarias batrachus. Hydrobiologia 57 : 11-15.

47. Mukhopadhyay, P.K. , and P.V. Dehadrai 1978. Malathion toxicity and impairment of drug metabolism in the air-breathing catfish; Clarias batrachus (Linn.) Indian J. Exp. Biol. 16(6), 688-689.

48. Dehadrai, P.V. 1978. Breed magur in paddy fields. Indian Farming, December, 1978.

49. Dehadrai, P.V. 1978. Technique of cage culture of air-breathing cat fishes. Symp. Develop. Inland Aqua. Haryana, Hissar, November, 1978.

50. Barua, S.K., M. Ranadhir, P.N. Bhattacharya and P.V. Dehadrai 1979. Economic potential of Clarias batrachus and its seed trade in West Bengal. Internat Symp. Inland Aquac. (CIFRI/IDRC) Barrackpore February 8-10, 1979.

51. Dehadrai, P.V. S. Mukhopadhyay and P.K. Mukhopadhyay 1979. Intensive culture of air-breathing catfishes. Clarias batrachus and Heteropneustes fossilis. Internat Symp. Inland Aquac. (CIFRI/IDRC) Barrackpore, February 8-10, 1979.

52. Dehadrai, P.V. V.K. Murugesu and P. Kumararajah, 1979. Culture of murrels in derelict waters Internat Symp. Inland Aqua (CIFRI/IDRC) Barrackpore, February 8 - 10, 1979.

53. Dehadrai, P.V. S.M. Banerjee and R.N. Pal 1979. Culture of Clarias batrachus with low input. Internat Symp. Inland Aquac. (CIFRI/IDRC) Barrackpore, February 8-10, 1979.

54. Dehadrai, P.V. and P.K. Mukhopadhyay 1979. Aspects of pollution studies in relation to aquaculture in India. Internat Symp. Inland Aquac. (CIFRI/IDRC) Barrackpore. February 8-10, 1979.

Contd.....

55. Mukhopadhyay, P.V. & P.V. Dehadrai, 1980 Studies on air-breathing catfish Clarias batrachus (Linn) Under Sublethal Malathion Exposure Indian J. Exp. Biol. 18:348-352.

56. Mukhopadhyay, P.V. & P.V. Dehadrai, 1980. Biochemical changes in the air-breathing catfish Clarias batrachus (Linn.) exposed to Malathion Environ. Pollution (Series A) 22 : 149-158.

57. Mukhopadhyay, P.V. A.P. Mukherji & P.V. Dehadrai, 1982 Certain biochemical responses in the air-breathing catfish Clarias batrachus exposed to sublethal carbosuron. Toxicology 23 : 337 - 345.

58. Mukhopadhyay, P.V. & P.V. Dehadrai, 1983. Early maturity and Breeding at two Catfishes Heteropneustes fossilis and Clarias batrachus Acta hydrochim et hydrobiol 11 (4): 473-477.

59. Venkatesh, B., A.P. Mukherji, P.K. Mukhopadhyay and P.V. Dehadrai, 1986. Growth and Metabolism of the catfish Clarias batrachus (Linn.) fed with different experimental diets. Proc. Indian Acad. Sci. (Animal Sci.) 95: (4):457-462.

60. Dehadrai, P.V. & P.K. Mukhopadhyay, 1987. Effect of urea supplementation in the feed of walking catfish Clarias batrachus J. Aquat. Trop 2:1-7.

61. Dehadrai, P.V. 1987. Perspectives of Fisheries Development in India. Asian Fisher. Soc. Meeting December, 1987, Mangalore, India.

62. Dehadrai, P.V. 1988. Opportunities for Women in Paddy cum Fish Culture. 1st IKRI/ADB Ubon, Thailand, March, 1988. Internal. Confer.

63. Dehadrai, P.V. 1988 Status of Aquaculture in South East Asia and India, USDA/ICAR International Symposium on Aquaculture Research Needs for the year 2000 - New Delhi - November, 1988.

64. Dehadrai, P.V. 1988 Socio-Economic Constraints in Sea Farming in India. Symposium Sea Farming for Main Land and Islands of India. - December 1988 - Bombay.

65. Dehadrai, P.V. 1988 Rice in Field and Fish in Water Indian Farming - November, 1988.

66. Dehadrai, P.V. 1988 Opportunities for Women in Rice-cum-Fish Culture International Conference on Appropriate Agricultural Technologies for farm Women - Future Research Strategy - November-December 1988 - New Delhi.

67. Dehadrai, P.V. 1988 Research Thrust on Improving Aquaculture Productivity. National Symposium on Aquaculture Productivity. Hindustan Lever Research Foundation - December, 1988.

68. Dehadrai, P.V. 1989 Fisheries Research:
40 years of Agricultural Research and Education in India, ICAR, NEW DELHI.

69. Dehadrai, P.V. 1989 Management of Fisheries Resources in India's EEZ. Nat. Instt. Oceanogr. International Train. Workshop.

70. Dehadrai, P.V. 1990 Fish Breeding Technology and Aquaculture in India. Nat. Workshop, Aquaculture Development, CIFA, Bhubaneswar.

71. Dehadrai, P.V. 1990 Opportunities for Women in Rice-cum-Fish Culture Rice Fish Research and Development in India Ed. by C. Lightfoot et al, ICLARM Conference Proceedings.

71. Dehadrai, P.V. 1990 Pollution and Aquaculture National Symposium Environmental Pollutants and Resources of Land and Water - Aurangabad.

72. Dehadrai, P.V. 1990 Planning and Policy Issues of Fish Diseases in India.
Internat. Workshop on Fish Disease & Health Management, ICAR, Indian Fish Health Research Institute, October, 1990.

73. Dehadrai, P.V. 1990 Problems of Aquaculture in India and Southern Asian Region Internat. Workshop - Aquaculture Research Needs by 2000 AD - USDA/ICAR Proceedings.

74. Dehadrai, P.V. 1990 Vocational Courses in Fisheries ICAR/NCART Workshop, Bombay.

75. Dehadrai, P.V. 1990 Fisheries Resources of India - Sustainable Aquaculture - Special Volume FAO/IAAA, World Food Day.

76. Dehadrai, P.V. 1990 Advances in Hydrobiology - Management of Aquatic resources. Nat. Symposium, Society of Environment, India, Indore.

77. Dehadrai, P.V. 1990 There's As Good Fish in the Sea As Ever Came out of it. Indian Farming, October 1990.

BIODATA

PROPOSED POSITION : Water Resources Specialist

NAME : R.S. Varshney

DATE OF BIRTH : 01 May, 1930

NATIONALITY : Indian

EDUCATION : (i) Ph.D, University of Roorkee 1972
(ii) M.E.(WRD) University of Roorkee 1962
(iii) B.E. (Hons.) (Civil) University of Roorkee 1951-52
(iv) B.Sc., Agra University 1949

OTHER TRAINING : Design and Construction of Arch Dams : Govt. of France

LANGUAGE & DEGREE OF PROFICIENCY : (i) English
(ii) French
(iii) Hindi

MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) National Academy of Engineering
(ii) Institution of Engineers (India)
(iii) Indian Association of Hydrologist
(iv) Indian Society of Engineering Geology
(v) Indian Society of Water Resource Engineers
(vi) System Society of India

9. COUNTRIES OF WORK EXPERIENCE : (i) India
(ii) Mauritius
(iii) France

10. EMPLOYMENT RECORD :

(i) From: 10/88 To: present
Employer: International Commission on Irrigation and Drainage.
Post held: Secretary-General

(ii) From: 7/87 To: 4/88
Employer: U.P. Irrigation Department
Post held: Engineer-in-Chief

(iii) From: 5/86 To: 6/87

Employer: U.P. Irrigation Department

Post held: Chief Engineer (Level I)

(iv) From: 12/83 To: 4/86

Employer: U.P. Irrigation Department

Post held: Chief Engineer

(v) From: 3/82 To: 12/84

Employer: Central Water Authority, Govt. of Mauritius

Post held: Projects Co-ordinator

(vi) From: 2/80 To: 3/82

Employer: Central Water Authority, Govt. of Mauritius

Post held: Engineering Adviser

11. DETAILED TASKS ASSIGNED : Water Resources Specialist

12. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

DATE OF SIGNING : 29 / 1 / 1992
DAY MONTH YEAR

CURRICULUM VITAE

1. Name **Dr. R.S. VARSHNEY**

2. Date of Birth **01 May 1930**

3. Educational Qualifications

- (i) **B.Sc., 1st Division, 2nd Position, Record percentage of marks in Maths 98%, Agra University, 1949.**
- (ii) **B.E.(Hons)(Civil), University of Roorkee, 1952, Guaranteed appointment in U.P. Irrigation Department, Roorkee University Senior, 1951-52.**
- (iii) **M.E.(WRD), University of Roorkee, 1962 - Record percentage of marks 84%, 1st Division, 1st position.**
- (iv) **Ph.D., University of Roorkee, 1972**
- (v) **Certificate in French Language, University of Besancon, France, 1965.**
- (vi) **Diploma in French Language of Alliance, Francaise, Paris, 1965.**
- (vii) **Diploma of French Government in "Planning, Design and Construction of Arch Dams", 1965.**

4. Posts held

- (i) **October 1988 to date, Secretary-General, International Commission on Irrigation and Drainage.**
- (ii) **July 1987 to April 1988, Engineer-in-Chief, U.P. Irrigation Department.**
- (iii) **May 1986 to June 1987, Chief Engineer (Level I), U.P. Irrigation Department.**
- (iv) **December 1983 to April 1986, Chief Engineer, U.P. Irrigation Department.**
- (v) **March 1982 to December 1984, Projects Coordinator (Post higher than Chief Engineer, Central Water Authority, Government of Mauritius.**
- (vi) **February 1980 to March 1982, Engineering Adviser (Post equivalent to Chief Engineer), Central Water Authority, Government of Mauritius.**

5. Positions Held

- (i) Chairman, Board of Consultants, Multipurpose and Hydroelectric Projects, Irrigation Department, U.P., January 1990 to date.
- (ii) Member, Panel of Experts, Srinagar Hydroelectric Project, U.P.
- (iii) Consultant, Small Hydro Corporation, U.P. Government
- (iv) Member, Dam Safety Review Panel, Government of Orissa.
- (v) Chairman, Dam Safety Review Panel, Government of West Bengal
- (vi) Chairman, Indian Standards Committee (RVP-7)
- (vii) Ex-Member, Board of Directors, U.P. Nalkoop Nigam (Tubewell Corporation); U.P. Micro and Mini Hydroelectric Corporation; U.P. State Bridge Corporation etc.
- (viii) Ex-Chairman, Indian Commission on Large Dams Committee on "Materials for Masonry and Concrete Dams"
- (ix) Ex-Officio Chairman and Member of various State Level Technical Committees and Member of many Central Government Committee upto April 1988.

6. Professional Experience

- Rich and varied experience of over 38 years of planning, design, construction and operation of many river valley projects and hydro-electric projects in India, Mauritius and France.
- Several research and design innovations
- Contributed many formulae and design principles in the domain of hydrology and water resources engineering.

7. Publications

- (i) Over 110 papers published in India and abroad
- (ii) Eight books on water resources engineering in English and one book in Hindi (in two volumes) acclaimed in India and abroad

8. Awards won

- (1) Dr. A.N. Khosla Research Prize, 1971
- (ii to iv) CBI&P Certificates of merit, 3 nos., 1964, 1973, 1980.
- (v to vii) CBI&P medal/mementoes and cash prizes - 3 times, 1976, 1979, 1980.
- (viii) Roll of Honour of Multipurpose and Hydro-Electric Organization, 1986.
- (ix) Hydrosem award of Institution of Engineers (India), U.P. Centre, 1987.
- (x) Pandit Jawaharlal Nehru Birth Centenary Research Award, 1988.
- (xi) Bharat Singh Award (1989)
- (xii) Roll of Honour (December 1990) by System Society of India.

9. Membership of Professional Bodies

- (1) Fellow National Academy of Engineering
- (ii) Fellow Institution of Engineers (India)
- (iii) Fellow Indian Association of Hydrologist
- (iv) Member, Indian Society of Engineering Geology
- (v) Member, Indian Society of Water Resources Engineers.
- (vi) Member, System Society of India

10. Visit to Foreign Countries

Have visited 26 countries all over the world till now.

1. Proposed Position : Impact Specialist

2. Name : Vikram Madhao Pattarkine

3. Date of Birth : 16 September 1961

4. Nationality : Indian

5. Education

Ph. D. (Environmental Engineering), 1991: Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, Virginia. Quality Credit Average 3.80/4.00. Thesis Title: The Role of Metals in Enhanced Biological Phosphorus Removal from Wastewater.
Adviser: Dr. Clifford W. Randall.

M. Tech. (Chemical Engineering), 1983: Nagpur University, Nagpur. First Division, Second Rank.

Thesis Title: Water Quality Studies near Koradi Thermal Power Station.
Adviser: Dr. J. R. Giradkar.

B. Tech. (Chemical Engineering), 1981: Nagpur University, Nagpur. First Division.

6. Other Training :

7. Languages : English, Hindi, and Marathi (Equally Fluently)

8. Memberships of Professional Societies : Water Pollution Control Federation.
Indian Association for Environmental Management.
Indian Institute of Chemical Engineers.

9. Countries of Work : India, United States of America
Experience

10. Employment Record and Work Experience

Research

Research Associate (August, 1991 - Present): Tata Energy Research Institute, New Delhi. Activities include

- assessment of environmental impacts of global warming
- assessment of environmental impacts of power generation and use
- energy generation from sewage sludge and other waste
- survey of coal briquetting technology and use of coal briquettes
- writing of research proposals and technical reports

Laboratory Coordinator (September, 1990 - April, 1991): Service Training for Environmental Progress (STEP), Virginia Tech. Activities included

- chemical analysis of water
- editing of technical reports by student interns
- computer assistance to STEP staff and interns

Graduate Project Assistant (September, 1989 - June, 1990): Environmental Engineering and Sciences, The Charles E. Via, Jr., Department of Civil Engineering, Virginia Tech. Activities included

- writing of a formal research proposal
- design, fabrication, and successful operation of a pilot scale biological nutrient (nitrogen and phosphorus) removal plant treating municipal wastewater
- writing of quarterly and final reports

Graduate Research Assistant (September, 1986 - August, 1989): Environmental Engineering and Sciences, The Charles E. Via, Jr., Department of Civil Engineering, Virginia Tech. Activities included

- assistance in sponsored research projects
- writing of technical reports

Edna Bailey Sussman Fund Environmental Intern (June - August, 1985): Activities included

- assistance in the Virginia Initiative Plant (VIP) biological nutrient removal pilot plant project at Lambert's Point Plant, Norfolk, Virginia.

Research Fellow (September, 1983 - August, 1984): National Environmental Engineering Research Institute (NEERI), Nagpur. Activities included

- assistance in air pollution monitoring
- writing of technical reports

Post-graduate Research Fellow (September, 1981 - August, 1983): Nagpur University. Activities included

- chemical analysis of water
- writing of Master's thesis.

Teaching

Visiting Lecturer (March, 1991): Department of Civil (Environmental) Engineering, University of Tennessee, Knoxville, Tennessee. Taught biological nitrogen and phosphorus removal to a post-graduate class.

Graduate Assistant (September, 1984 - June, 1985; September, 1985 - June, 1986): Environmental Engineering and Sciences, The Charles E. Via, Jr., Department of Civil Engineering, Virginia Tech. Provided teaching assistance to several post-

graduate and undergraduate courses in environmental engineering. Taught as a substitute in the absence of the instructing professor whenever the need arose.

11. Detailed Tasks Assigned

Study of the impact of climate change on water resources

12. Certification

I, the undersigned, certify that, to the best of my knowledge and belief, this bio-data correctly describes myself, my qualifications and my experience. I understand that my willful misstatement described herein may lead to my disqualification or dismissal, if employed.

15. Signature



16. Date of Signing : 27 January 1992

BIODATA

PROPOSED POSITION : Soil Scientist

NAME : Shankar Prasad Banerjee

DATE OF BIRTH : 17 November, 1934

NATIONALITY : Indian

EDUCATION : (i) D. Phil, Soil Science 1968

(ii) ASSOC. IARI, Soil Science & Agri. Chemistry with Specialization in Soil Survey and Land Utilization.

(iii) B.Sc. (Hons.) Agri. 1956

OTHER TRAINING : 'O' Course of the Indian Photo-interpretation Institute, Dehra Dun, India in Aerial Photography, Aerial Photo-interpretation and Remote Sensing for natural resources survey

LANGUAGE & DEGREE OF PROFICIENCY : (i) Bengali (Matriculation)

(ii) Hindi (Qualifying examination of Delhi University)

(iii) English (up to B.Sc. Hons.)

(iv) German (Intermediate)

MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Indian Society of Soil Science

(ii) Society of Indian Foresters

(iii) International Union of Forestry Research Organizations.

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD : .

From: 9/89 To: 2/91

Employer: M/s. Sarada Fertilizers Limited, Calcutta.

Position held: Chief Chemist-cum-Administrative Manager of the Single Super Phosphate manufacturing company.

Description of duties: Overall responsibility for (a) quality control of the product, (b) pollution control of the environment in and around the factory, (c) research and development activities associated with the industry and (d) general administration of the factory.

(ii) From: 6/88 To: 9/89

Employer: Forest Research Institute, Dehra Dun

Position held: Co-ordinator Scientist 'SE', Forest Soil-Vegetation Survey.

Description of duties. Planning, implementation and coordination of soil-vegetation survey work of the forest areas and potential forest areas of the country.

(iii) From: 5/76 To: 6/88

Employer: Forest Research Institute & Colleges, Dehra Dun

Position held: Senior Research Officer & Officer-in-charge, Northern Regional Centre, Forest Soil-Vegetation Survey.

Description of duties: Planning and execution of soil-vegetation survey of the forest and potential forest areas of the northern region of the country on the basis of assigned priorities, supervision and guidance of scientific/technical works related to soil-vegetation survey in field, laboratory and also in cartography and preparation of soil-vegetation survey reports with sets of complementary maps for the benefit of the end-users. Tackling soil-related special problems of forests. Teaching the probationer officers of Indian Forest Service and State Forest Service the subject of soil science. Research guidance to the officers, staff and students.

(iv) From: 5/64 To: 5/76

Employer: Forest Research Institute & Colleges, Dehra Dun

Position held: Research Officer

Description of duties: Conduct research on specific problems/projects on forest soils, render research guidance to the staff and students and supervising their works and teaching the officers probationers of Indian Forest Service, State Forest Service, Special Refresher Course and special trainees from home and abroad the subject of soil science.

(v) From: 5/60 To: 5/64

Employer: Indian Agricultural Research Institute, New Delhi

Position held: Soil Survey Assistant

Description of duties: Conduct soil survey and mapping of parts of the catchment areas of Chambal and Sutlej rivers tributary-wise and bring out soil survey reports with sets of complementary maps for the benefit of the end users. As Leader of a soil survey party, scientific/technical responsibilities as well as administrative charge.

11. DETAILED TASKS ASSIGNED :

(i) Soil Scientist

12. CERTIFICATION :

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : JM:11/11/92

DATE OF SIGNING : 27 / 01 / 1992

DAY MONTH YEAR

BIO DATA

1. PROPOSED POSITION : Sea Level Rise Specialist

2. NAME : S.N. Dwivedi

3. DATE OF BIRTH : 16 June, 1933

4. NATIONALITY : Indian

5. EDUCATION : (i) Doctorate in Marine Sciences
Tres Honourable et felicitations de Jury, 1964, Paris University
(ii) Bachelor of Law
Agra University, 1955
(iii) Research Scholar
Paris University, Paris, 1960-64

6. OTHER TRAINING : UNESCO Fellowship
Post Doctoral Fellowship for studies in USA and Canada, 1964-65
1. Woods Hole Oceanographic Institution, Woods Hole.
2. Scripps' Instt. of Oceanography, La Jolla
3. Fisheries Research Bureau of Canada, Halifax

7. LANGUAGE & DEGREE OF PROFICIENCY English: Read, write and speak fluently and can speak French

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES 1) Fellow of Ultra Sonic Society of India, New Delhi, 1988
11) Elected Life Member of the Society of Fishery Technologist of India, 1986
111) Fellow of the Indian National Science Academy, Allahabad, 1983
iv) Fellow of the Inland Fishery Society of India, 1980
v) Elected life member of Marine Biological Association of India, Cochin, 1977
vi) Elected life member of Indian Fisheries Association, Bombay, 1976
vii) Fellow - National Agricultural Academy of Sciences 1991

9. COUNTRIES OF WORK EXPERIENCE : India, France, USA, Canada, Laos

EMPLOYMENT RECORD

: In Annexure I (6)

DETAILED TASKS ASSIGNED :

Sea-Level Rise Impact Specialist :

Worked as a member in the UNESCO team for research in Relative sea-level change: a critical evaluation (UNESCO [COMAR] Working Group on Mean Sea-Level Rise and its influence on the Coastal Zone), 1990.

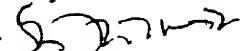
Organised larger marine eco-systems of Bay of Bengal for the purpose of UNFSCO, IUCN held in January 1991 at Monaco.

UNESCO Resource person for programmes related to Storm surges, and Cyclones and aquaculture in December 1991. Organized Coastal Zone Management Program 1976-1992 for UNESCO & I

: I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

India.
CERTIFICATION

SIGNATURE

: 

DATE OF SIGNING : 31 01 92
DAY MONTH YEAR

B I O D A T A
OF
DR. S.N. DWIVEDI,
ADDL. SECRETARY
DEPARTMENT OF OCEAN DEVELOPMENT
NEW DELHI

B I O D A T A

2. Qualifications:

Doctorate in Science	Tres Honourable et felicitations de Jury	1964
Bachelor of Law	Agra University	1955
Research Scholar	Paris University, Paris	1960-64
UNESCO Fellowship	Post Doctoral Fellowship for studies in USA and Canada	1964-65
	<ol style="list-style-type: none"> 1. Woods Hole Oceanographic Institution, Woods Hole. 2. Scripps Instt. of Oceanography, La Jolla 3. Fisheries Research Bureau of Canada, Halifax 	

3 Other Distinctions

i) Fellow of Ultra Sonic Society of India, New Delhi. 1988

ii) Elected Life Member of the Society of Fishery Technologist of India. 1986

iii) Fellow of the Indian National Science Academy, Allahabad. 1983

iv) Fellow of the Inland Fishery Society of India. 1980

v) Elected life member of Marine 1977

Biological Association of India,
Cochin.

vi) Elected life member of Indian Fisheries Association, Bombay. 1976

6. Details of Career

6.1. Additional Secretary to the GOI, Department of Ocean Development, New Delhi. Aug., 1986 to-date

Director 1984-86
Central Institute of Fisheries
Education, (ICAR) (Now Deemed University
of Fisheries)

Director 1974-77
Fishery Survey of India (Additional charge)
Government of India
Bombay

Asst. Director and Head, Biological
Oceanography Division, NIO, CSIR. 1970-74

Prof. Natural Science 1967-70
Royal Govt. of Laon (Colombo Plan)

Senior Scientist 1965-67
(CSIR (Indian Programme of International
Indian Ocean Expedition)

Asst. fisheries Officer & 1951-60
Asst. Director of Fisheries.

1.2 Post doctoral studies on USA & CANADA

Under International Oceanographic Commission (IOC), UNESCO fellowship, conducted post doctoral studies in USA and Canada. worked at Wood Hole Oceanographic Institution, Woods Hole. (Mass). Scrips Institute of Oceanographic and Inter Americical Tropical tuna commission, La Jolla, (Calif) and in Canada at Toronto University, Toronto; Fisheries Research Board of Canada, Halifax etc.

5. OCEANOGRAPHIC EXPEDITIONS:-

Undertook Biological Oceanography research in the Atlantic Ocean off European coast from Scandina to Moroacco and in the editerrenean sea, in the Gulf of Marine, US coast. At the Inter American Tropical Tuna commission. Studied Tuna stocks using genetic methods in the Pacific Ocean. Participated in the Oceanographic cruises and expeditions in the North Atlantic of the coast of USA and canada, in the Baltic sea, Central and south Atlantic ocean, Mediterranean Sea and the Indian Ocean. These studies led to identification of ecological niches, and tuna migrations across the Atlantic and evaluation of production potential of the Indian Ocean.

6. INTERNATIONAL RECOGNITION

(As Addl. Secretary, DOD)

- 6.1 1986, Elected Chairman of the Committee on Planning Administration and Finance of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Hobart, Australia.
- 6.2 1987 Represented India in the meeting of Intergovernmental Oceanographic Commission, UNESCO, Paris where India was elected as member of the Executive Council of the IOC with second highest majority of votes.
- 6.3 1988 unanimously elected as CO-CHAIRMAN of the Regional commission, for Central Indian Ocean (IOCINDIO) of the Inter-governmental Oceanographic Commission, UNESCO.

7. OCEAN DEVELOPMENT

7.1 COMPUTERISATION OF MARINE SCIENCE DATA (LIVING RESOURCES))

For the first time in India, a pilot project has been completed, to process in real time, shipboard data on living resources this being adopted by other institutins.

7.2 ISLAND DEVELOPMENT AUTHORITY - MEMBER

BOOK - TECHNOLOGY OPTIONS FOR ISLAND DEVELOPMENT

During this period, developed computerisation information on survey of living and non-living resources around the islands, has compiled and published a book ISLAND DEVELOPMENT - TECHNOLOGY OPTIONS. This book was released by the Hon'ble Prime Minister in the meeting of Island Development Authority on 29th June, 1988 in New Delhi.

7.3 MARINE POLLUTION

Started oil pollution studies in India in 1970. This led to starting a UNEP oil pollution project in NIO. Later developed projects on marine pollution studies and UNEP funded a project for Indian Ocean at a cost of US\$ 1.0 million. A status report on marine pollution has been completed. As a result of India's work during 1988, IOC, UNESCO has nominated India to conduct regional training programme for marine pollution, research and monitoring. The programme will be financed by UNESCO. Also developed CONTINGENCY PLAN FOR OIL SPILL for India.

7.4 ECOLOGY OF ESTUARIES

Started multi-disciplinary studies of the estuarine system in 1970, - on the lines of cheapseake Bay, USA. This led to 110 publications in physical, chemical, geological and biological oceanography. The pattern is now being following all over India.

7.5 COASTAL ZONE MANAGEMENT

Ocean greatly influence the sustained productivity, ecology and environment of the coastal states. R&D project on coastal zone Development has been initiated. Under this project it is proposed to cover all coastal States and the islands during Eight Five Year Plan. It may be stated that the comprehensive study was started

in 1972 and a first international workshop was conducted 1974 to underline multi-disciplinary use and the management of Coastal Zone. In VIIth Plan this is proposed to be a major All India Coordinated Project. The data processing computerisation facility has also been installed in the Department of Ocean Development, to monitor major programmes in Ocean Development.

7.6 OCEANOGRAPHIC STUDIES AND MANAGEMENT

During 1965-67 and 1970-74 assisted in Management of Indian Ocean Biological centre (IOBC) at Cochin and manpower training and selection of site and planning of NIO at Goa. Started the important programmes of the Oceanography along the West coast of India, Monitoring and Prevention of oil pollution, Ecology of estuaries. Study of Sand dune flora and protection of beaches, accretion and erosion, management of mangroves and and survey of living resources. This study was adopted by FAO a basic document for starting Indian Ocean Fisheries Commission. These projects are now major oceanographic programmes in Indian Ocean and have adopted by UNESCO, WMO and other international organizations. These studies resulted in delineating five ecological zones along India coast and development of coastal zone Management programmes.

8. TECHNOLOGIES AND MANPOWER DEVELOPMENT

8.1 HI-TECH AQUACULTURE SYSTEM AND DELINKING FISH BREEDING FROM MONSSON

This new technology provides environmentally controlled system, creation of reverine conditions, use of synthetic growth and breeding hormones, live and formulated feeds. Under the systems fish breeding has become independent of monsoon season and the breeding period has been extended from one month to seven months. Further the density of raising fry in one cubic meter of waters has been increased from 100 with 30% survival to 5000 with 90% survival. This is a quantum jump. This technology opens up possibilities to double India's fish production in the coming 5 years. Further the system is also effective for intensive rearing of

prawns with density of 7000 post larvae per meter cubic. The technology has been demonstrated successfully and commercial production is in progress in Haryana, U.P, MP, Maharashtra, Andhra Pradesh and Tamilnadu. It is now being adopted by entrepreneurs with institutional finance. The I.R.R. Scheme for this technology is around 40%. This scheme is an improvement over world bank hatcheries which have been installed in five states. Also developed Hi-Tech Aquaculture for prawn and fish and has generated fish based mixed farming system with annual turnover of Rs.100 crores in the 4 coastal districts of Andhra Pradesh. In addition, a new technology of culturing marine fish and prawn in the inland saline waters has been demonstrated in Gurgaon in Haryana. This work has been acclaimed at international level and is very important for Haryana, Punjab, Rajasthan and also for countries in Middle East.

8.2 Post Graduate course- Started M.Sc in Fisheries Management at CIFE, Bombay. The programme was inaugurated by Sardar BUTA SINGH, formerly union Minister for Agriculture, GOVERNMENT OF INDIA.

8.3 Education and Research at Central Institute of Fisheries Education(CIFE), Bombay.

Apart from organizing national training programmes for human resource development in the state sector, also organized a large number of international training programmes for the FAO, IOC and Commonwealth Secretariat. In the process, provided training to over 3000 scientists and officers at the graduate and post-graduate level. Dedication to the cause of marine education has led to the recognition of the CIFE as a Deemed University. Eleven students have completed Ph.D under me.

9. INTERNATIONAL EFFORT

Actively work is done in collaboration with the international organization (IOC), Marine Science Division of the UNESCO, Scientific Committee of Antarctic Research(SCAR), etc. I have made notable contributions as a member of Marine Science at the international level while safeguarding the interest of India.

10. FUTURE PERSPECTIVES

Travelled widely and has contributed to the development of Ocean Sciences and Technologies, which have far reaching potential for employment generation, sustainable exploration of marine resources and development of new industries in coastal states. The major programmes relate to increase of production from Living and non-living resources of the oceans, wave energy and geosphere-biosphere programme. The implementation of new multidisciplinary programmes and technologies developed can help in generating new employment opportunities, increased production, more foreign exchange earnings and enhance India's prestige and leadership in the field of Ocean Science, technology and development.

11. Published four books viz. 1. Island Development & Policy Options(1988), 2. Proceedings of Workshop on Antarctic Studies, 3. Coastal Zone Management(1989), 4. Charter for Nature(1990). In addition, 174 scientific papers have been published in national and International journals.

12. In the Department of Ocean Development I have been associated with multi-disciplinary scientific programmes and have been interacting with various Ministries/Departments and research institutes of CSIR and ICAR. The ministries with which we had interaction are Department of Bio-Technology, Ministries of Environment, Agriculture & cooperation, commerce(MPEDA) etc. In CSIR major involvement with NIC, CMCR, NERI, CDRI, IDRC, CIFT. ICAR institutes which are associated with other programmes are CMFRI, CIFE, CIFT Cochin, CIBA, CIFRA, CIFCRI Etc.

13. PROGRAMMES RELATING TO GLOBAL WARMING AND SEA LEVEL RISE

1. The Marine Science Division of UNESCO invited the undersigned to prepare a paper entitled "Relative Sea Level Change: A Critical Evaluation".
2. Also developed regional programmes and presented papers with respect to long term scientific implications to understand sea level rise and

B I O D A T A

DR.S.N. DWIVEDI
ADDITIONAL SECRETARY
DEPARTMENT OF OCEAN DEVELOPMENT
NEW DELHI

Dr. B.N. Dwivedi, D.Sc (Paris), L.L.B., F.N.A. Sc.,
Additional Secretary, Department of Ocean Development

I. ICAR : Member, Governing Body and 1981-86
Standing Finance Committee

: Director, CIFE 1974-86

II. RESEARCH, MANAGEMENT AND DEVELOPMENT

Interministerial Coordination

*

- i) AGRICULTURE : ICAR Labs and Agricultural Universities.
- ii) SCIENCE AND TECHNOLOGY : DST, IMD, DBT & CSIR Laboratories.
- iii) COMMERCE : MPEDA.
- iv) ENVIRONMFNT AND FORESTS : Central Pollution Control Board and Ecology.
- v) DEFENCE : DRDO.
- vi) MEA : UN Law of Sea-Deep Sea bed mining.
- vii) EDUCATION : IITs, Universities.
- viii) INTERNATIONAL : FAO, UNESCO, IOC(OSLR & MAP), UNEP Regional Seas, Law of the Sea, Deep Sea Bed Mining.

III. PROJECT AREAS Marine Environment, living resources, global warming and sea level rise, wave energy, coastal resources, manpower development, Antarctic deep sea bed mining.

IV. I have also worked under Prof. Beny Shaeffer who was Science Adviser to the President of USA (1964-65).

V. My experience of working with the Members of ICAR, CSIR, Universities for implementation of national and global programmes would be useful in bringing out exponential growth in DARE to meet new challenges of research, education, socio-economic demands and employment needs.

VI. In India, I have worked with Prof. M.G.K. Menon, FRS, Dr. M.S. Swaminathan, Dr. O.P. Gautham, Dr. N.S. Randhawa, Secretaries of Department of Agriculture, Mr. G.V.K. Rao and Mr. B. Sivaraman Member, Planning Commission.

2. RESEARCH MANAGEMENT AND ADMINISTRATION

1. Fellow, National Academy of Sciences, Allahabad.
2. Member, Island Development Authority, Chairman, Prime Minister of India, (1986-89);
3. Co-Chairman, Central Indian Ocean Commission of IOC, UNESCO, Paris (1987 till date);
4. Chairman, Administration and Management Committee, Commission for Conservation of Antarctic Marine Living Resources, (CCAMLR) Hobart, Australia (1986-88);
5. Member, Expert Groups of UNESCO to design
 - a) global programmes for climate change and Sea Level Rise, IOC UNESCO
 - b) Ocean Science and Living Resources (1987-Continuing)
6. Member, National Committee of the
 - a) International Geosphere-Biosphere Programme (1988 - Continuing)
 - b) National Coordination Committee for Long Term Programme of Cooperation in Science and Technology (ILTP) India and USSR (1988 - Continuing)
7. President, Biological Section of the National Academy of Sciences, Presidential Address on "Conservation of Aquatic Ecosystems and their management through HI-tech Aquaculture. The Technology has received appreciation from USA, Europe, Asia and South America; (1989 till now);
8. Vocational Education for Fisheries in Lakshadweep.

9. Developed CIFE into a 'Deemed University' in shortest period. Trained approximately 3000 officers from India and 105 from neighbouring countries.
10. National Projects started by me have been **ADOPTED AS INTERNATIONAL PROGRAMMES**
11. ECOLOGY AND CONSERVATION OF MANGROVES (1970) - adopted by UNESCO;
12. OIL POLLUTION IN INDIA (1971). Regional Seas Programme adopted by UNEP
13. First Workshop on Ocean Development - (1975) at CIFE, Bombay;
14. First International Workshop on Coastal Zone Management (1981).

3. UNESCO PROJECTS

- i) Developed Regional Programmes for "OCEANOGRAPHY FOR THE NON-INDUSTRIALISED COUNTRIES" for Inter-governmental Oceanography Commission (1991);
- ii) ECOLOGY OF RIVER BASINS - for Central Asian Regional Project; Man and Biosphere Programme (1990);
- iii) RELATIVE SEA LEVEL CHANGE A critical evaluation - UNESCO Marine Science Report No.54 (1989-90);
- iv) COASTAL ZONE MANAGEMENT PROJECT for the Indian Ocean Region Marine Science Division, UNESCO (1988)

4. NEW TECHNOLOGIES

- a) Fish Based Mixed Farming in A.P. (1975-86). Present turn over is Rs.150 crores/annum in 4 districts, A.P., M.P., Andhra Pradesh, Rajasthan and Haryana.
- b) Delinking of Fish Breeding from Monsoons.

- c) Introduced "Hi-tech aquaculture and intensive rearing systems" in Madhya Pradesh and Rajasthan - Extensive - Intensive - Industrial Aquaculture.
- d) CULTURE OF MARINE FISHES AND PRAWNS IN SALINE SOILS OF HARYANA
- e) Agriculture Research and Education - Integrated multi-disciplinary approach.

5. POST DOCTORAL STUDIES

1. Prof. G. Tessier, Sorbonne, Paris University.
(Population genetics and relative growth)
2. Prof. Benny Shaffer, Science Adviser to President of U.S.A. (1964-65) (tuna and flat fishes).
3. Scripps Institute of Oceanography, California, U.S.A., (1965).
4. Woods Hole Oceanography, Woodshole.
5. Dr. FEJ, Fry University of Toronto,
6. Fisheries Res. Board of Canada, Halifax.

...

BIO-DATA

1. PROPOSED POSITION : Impact Specialist

2. NAME : PROF. V. ASTHANA

3. DATE OF BIRTH : AUGUST 26, 1940.

4. NATIONALITY : INDIAN.

5. OTHER TRAINING : a) National Research Council of Canada Post- doctoral fellow. Atlantic Oceanographic laboratory, bedford Institute, Dastmonth, Canada.
b) Alexander von Humboldt fellow at the Institute of Environmental Sedimentology, University of Heidelberg, Heidelberg, Germany.

7. LANGUAGE & DEGREE OF PROFICIENCY : ENGLISH - EXCELLENT
HINDI - EXCELLENT
URDU - GOOD

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : Member and Treasurer of the Indian Association of Limnologists and Oceanographers.

9. COUNTRIES OF WORK EXPERIENCE : U.S.A., CANADA, GERMANY

10. EMPLOYMENT RECORD :

FROM 1972 TO CONTINUING
EMPLOYER : JAWAHARLAL NEHRU UNIVERSITY
NEW DELHI, INDIA.
POSITION HELD & : Professor

DESCRIPTION OF**DUTIES**

: Teaching graduate courses in Oceanography, Coastal and estuarine processes, Guidance of M.Phil/Ph.D. research.

FROM 1/1968 TO 6/1968

EMPLOYER : State University of New York at New Paltz

POSITION HELD & : Assistant Professor ,Teaching
DESCRIPTION OF Duties : of undergraduate Courses in Geology

11. DETAILED TASKS : Sea Level Specialist
ASSIGNED

(A) Member of the 'task Force' constituted by the Govt. of Canada to combat the Oil spill from a grounded tanker in the chedabucts Bay.Nova scotia. Winter of 1970
Was a member of the team assigued to study the behaviour of crude oil on beaches.

(B) Limnological studies of Lake Chilka (A coastal lagoon).A project carried out under Man and Biosphere Programme.

1986 to 1988 Project Leader
The objective of the project was to determine baseline environmental parameters of the largest brackise water body in India in order to safegnard its environmental integrity from development projects.

(C) All India Co-ordinated Project for Studying the Impact of Greenhouse induced Sea Level rise on the Coast Line of India.
1990-1992

Coordinator of the Project.
The project has been commissioned by the Govt. of India, Ministry of Environment and Forests for making a 1st order impact assessment for facilitating future policy options.

Under this project eight groups are working on different sectors of the Coastline following a Common methodology.

I have also participated in the following meeting/workshops which are relevant to the problem of sea level rise.

(i) International workshop on Sea Level Rise. Sponsored by US-EPA and held at the University of Maryland, College Park, U.S.A. Sept. 1989.

(ii) Member of the Indian Delegation to the Conference of Small Island Nations and the Sea Level Rise. Male, Rep. of Maldives. Nov. 1989.

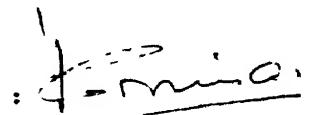
(iii) IPCC Workshop on Adaptive Options and policy implications of Sea Level Rise and other Impacts of Global Climate Change Miami, Florida 27 Nov.-Dec. 1989.

(iv) IPCC response Strategies Group. Adaptive response to Climate Change: Coastal Zone Management Workshop, Perth, Australia, 1990

12. CERTIFICATION

: I, the undersigned certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE



DATE OF SIGNING :

31/12/92

DAY MONTH YEAR

CURRICULUM VITA
VIRENDRA ASTHANA

Professor of Geology and Oceanography
School of Environmental Sciences
Jawaharlal Nehru University
New Delhi 110067

TELEPHONE	TELEX
669325 (RES)	031 -4967 JNU IN
667676 EXT 358 (OFF)	FAX : BIC-JNU 91-011-686-5886

EDUCATION

Ph.D Sedimentology (1969) . The University Of Wisconsin

M.Sc. Geology (1961) . Lucknow University ,Lucknow.

B.Sc. Geology (1959). Geology , Botany, Zoology, Lucknow University Lucknow.

POSITION HELD

Professor of Geology /Oceanography (1972 -cont.)School of Environmental Sciences, Jawaharlal Nehru University, New Delhi.

National Research Council of Canada Postdoctoral Fellow ,(1968 - 1970) Bedford Institute of Oceanography,Dartmouth, Nova Scotia, Canada.

Visiting Lecturer of Geology (1968 -1970).The State University of New York at New Paltz.

RESEARCH

- (i) Impact of Sea Level Rise Along the coasts of Orrisa and West Bengal (1990 -). A project funded by the Ministry of Environment and Forests, Government of India.
- (ii) All India Co-ordinator (1990 -) for the projects of the study of impacts of a possible sea level rise along the coastline of india . Ten projects commissioned and funded by Ministry of Environment and Forests, Government of India.
- (iii) Impact of Stone Crushing on the Ambient Air Quality in the Faridabad region(1990). Funded by the Haryana State Board for Prevention and Control of Water Pollution.
- (iv) Alexander Von Humboldt Fellow(1981 -1983). The Fellowship period was spent at the Institute of Environmental Sedimentology of the University Of Heidelberg,West Germany.
- (v) Limnological Studies of Lake Chilka in Orrisa(1976 -1978) project funded by the Dept. of Science and Technology, Govt. of India and Man and the Biosphere Program.
- (vi) Project leader of the Coastal Geodynamics Group of the Atlantic Oceanography Laboratories of the Bedford Institute Dartmouth(1968 -1970).

SPECIAL ASSIGNMENTS

- (i) Member, Environmental Protection Council, Delhi.
- (ii) Member of the Indian Delegation In the Conference of Small States on the Problem of Sea Level Rise as a Consequence of the Greenhouse Effect held in Male, Republic of Maldives, Nov. 1989
- (iii) Country Representative at the Miami and Perth Workshop organized by the Coastal Zone Management sub-group III of the Inter-governmental Panel on Climate Change(IPCC). Nov, 1989 and Feb. 1990.
- (iv) Member Secretary , Coastal Environmental Group (1981) Ocean Science Technology Agency, Govt. of India.
- (v) Director (1976) , Short Course on Marine and Estuarine Environment for University and College Teachers Sponsored by the University Grant Commission.
- (vi) Member, Group on Research and Education of the Panel on Marine Resources Planning Commission, Government of India.
- (vii) Member of the task force on Non-living Marine Resources Planning Commission, Government of India.
- (viii) Member of the task Force Project Oil to investigate the problems of oil spills on the beaches arising as a result of the grounding oil tanker in the Nova Scotia Waters. (1970).

ACADEMIC ADMINISTRATION

Extensive experience of formulation of syllabi, ordinances and other academic affairs over a period of last fifteen years through membership of the Academic Council, Board of Studies, J.N.U. Delhi University, North Eastern Hill University, Kanpur university and various Engineering Colleges of the Defence Ministry.

ACADEMIC AND SCHOLASTIC AWARDS

- (i) Alexander von Humboldt Foundation Fellowship to carry research work in the Federal Republic of Germany, (1981 -1983)
- (ii) Travel cum study grant from the Ford Foundation to visit research institutions of Oceanography and Limnology in the U.K., U.S.A., and the Netherlands (1978).
- (iii) Postdoctoral fellowship of the National Research Council of Canada. (1968 -1970).
- (iv) Kemper K. Knapp Fellow, The University of Wisconsin, Madison, Wisconsin. (1966).

REFERENCES

1. Dr. Syed Zahurul Quasim
Member, Planning Commission
Govt. of India
Yojna Bhawan
New Delhi - 110 001
2. Dr. B.N. Desai
Director Institute of Oceanography
Dona Paula, Goa
India
3. Prof. N. C. Nigam
Director
Indian Institute of Technology
Hauz Khas
New Delhi 110 016

PUBLICATIONS

1. Asthana, V. (1963). Summary of Marine Permian Formations of India and Adjacent Countries. Unpublished M.S. Thesis . The University of Wisconsin, Madison, Wisconsin.
2. & Schmidt, RA (1964). Particulate Matter From Roosevelt Island, Antarctica. Res. Rep. Ser.: The University of Wisconsin, Geophysical and Polar Research Center, v. 6, no.2.
3. Schmidt, RA & Asthana V. (1964). Occurrence of Particulate Matter in Four Countries of Snow Deposits at the South Pole. The University of Wisconsin, Geophysical and Polar Research Center. Res. Rep. Ser.: v.6 no.4.
4. Asthana V. (1969).The Mt. Simon Formation (Dresbachian Stage) of Wisconsin. Unpublished Ph.D. Thesis . The University of Wisconsin, Madison, Wisconsin.
5. (1971).The Crisis of Environment : A New Dimension in the Study of Coastal Geological Processes in Proceedings of Symposium on Indian Ocean and Adjacent Seas. Cochin, January 1971.
6. (1972).Oil Pollution and the Concept of Contingency Planning (abs). Symposium on Effect of Human Environment on Atmosphere, Land and Water. Andhra University, Waltare, January 1972.
7. (1975).Problems and Issues in Coastal Zone Management. Paper presented at a workshop on Modern Concepts in Geography. Kanpur University, Kanpur, Nov.1975.
8. & Marlow, JI.(1970).Oil Contamination and the Coast in Report of the Task Force on the Threat of Oil Pollution in the Chedabucto Bay, Nova Scotia, Canada. Deptt. of Energy, Mines & Resources, Ottawa, Canada. v.2.
9. Asthana V. (1978). Mineral Resources of the Continental Margins: An Introduction in the " Law of the Sea, Caracas and Beyond". ed. RP Anand, Radiant Publisher, New Delhi. 380 p.
10. Tripathy BC., Singhal CS. & Asthana V. (1978). Primary Production Studies in Lake Chilka (abs). International seminar on Application of Solar Energy To Biological Processes. Madurai University, Madurai, January 1978,
11. Raza M. & Asthana V.(1979). Ecology and Development: The Indian Experience. IUG Symposium, Moscow, July 1979.

12. Asthana V. (1979). Problems and Issues in the Management of a Coastal Lagoon : A Case Study of Lake Chilka (abs). National Seminar on Protection of Marine Environment. Panaji, Goa, Nov. 1979.

13. Hedge N. & Asthana V. (1980). Heavy Metal Enrichment in the Surficial Sediments of Lake Chilka (abs). 26th International Geological Congress, Paris, July 1980.

14. Kanth, T.A & Asthana V. (1980). Longshore movement along Madras & Puri Beaches, A Comparative Study. III Convention Of the Indian Association of Sedimentologists, Banaras Hindu University, Varanasi, December 1980.

15. (1982). Size Longshore Transport Velocity Relationship along the Puri Beach. Indian Journal of the Marine Sciences, V. 11, pp 83 - 85.

16. Asthana V & Kanth T.A. (1986). The Littoral Drift Of Sand along Puri and Madras Beaches, In: R.A.K. Srivastava (Editor) ,The Sands : Processes and Products, Wadia Institute of Himalayan Geology, Dehra Dun

17. Asthana V. & Kanth T.A. (1986). Suspended Load Versus Bed-Load Sediment Transport in Puri And Madras Beaches, East Coast of India. Indian Journal Of Marine Research. V 16.

18. Asthana V. (1989). Challenge of Managing the Sea Level Rise (Invited Paper). National conference on Coastal Zone Management. Cochin, February 20 - 23.

19 Asthana V. (1989). Environmental Impact of Sea Level Rise on Wetlands , Paper presented at the International Workshop on 'Adaptive Options and Policy Implications of Sea Level Rise and Other Coastal Impact of Global Climatic Change. Miami, U.S.A. 27th Nov. -1st Dec.1989.

20 Asthana V. (1989). Impact of Sea Level Rise along the Coast of India: An assessment Country Paper Presented at International Workshop on Sea Level Rise. University of Maryland, College Park M.D. U.S.A. Sept. 8th - 19th 1989.

21. Asthana V., Khosoo ,T.N. & Jayal ,N.D. (1989) Regional Co-operation for the Protection of Coastal Environment in the South Asia . South Asia Journal. V.3 No 12. pp109 -120.

22. Asthana V. (1989). Impact of Sea Level Rise on Coastal Lowlands. South Asia Journal. V. 3. No.1 2 pp. 103 -108

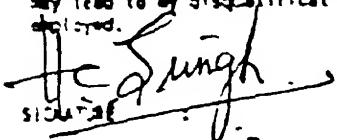
23. Asthana V.& Unnikrishnan A.S. (1989). Diffusion Characteristics of the Kakinada Bay for Effluent Assessment. Proc. Acad. Science (Earth & Planet. Sci.), V. 90 no. 3. pp. 237 -245.

24. Asthana V.(1989) "Environmental Implications of Sea Level Rise", paper presented at adaptive responses to climate change: Coastal Zone Management Workshop . Perth, Australia, Feb 1990

BIODATA

1. PROPOSED POSITION : Public Health Specialist
2. NAME : Harcharan Singh
3. DATE OF BIRTH : 18th October, 1932
4. NATIONALITY : Indian
5. EDUCATION : M.B.B.S; M.D (COMM - HEALTH)
6. OTHER TRAINING : Health Administration
7. LANGUAGE & DEGREE OF PROFICIENCY : English
8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : See Bio-data sheet attached
9. COUNTRIES OF WORK EXPERIENCE : - do -
10. EMPLOYMENT RECORD : - do -
11. DETAILED TASKS ASSIGNED : Public Health Specialist

12. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.


Signature

DATE OF SIGNING: 30/1/92
Day Month Year

BIO-DATA OF DR. MARCHARAN SINGH, M.D., F.I.A.I.S.M.
Ex - ADVISER, Health and Family Welfare, Planning Commission,
now Health Consultant.
70-A, Tagore Nagar, Ludhiana (Punjab)

Name ... DR. MARCHARAN SINGH

Qualifications... M.B.B.S. - May 1957 (Nagpur)
- M.D. Social & Preventive Medicine - May 1963 -
A.I.I.M.S., New Delhi.
- "STAFF COLLEGE COURSE" 1971 in Health
Administration - N.I.H.A.S.
- Certificate Course in Epidemiology - 1972
A.I.I.H.S., Calcutta.

Date of Birth ... 18th October 1932 (19.10.1932)

Positions held - I Tutor - S.P.M. - Medical College, Jabalpur
Period/Scale (2 years) Feb 1958 - Feb 1960

of pay II Demonstrator S.P.M. A.I.I.M.S. - New Delhi
(4 years) Feb 1960 - Feb 1964

III Asstt. Professor S.P.M. Medical College,
(4 yrs. 8 months) Rohtak.
Feb 1964 - Oct 1968

IV Professor & Head - S.I.O.
(13 years & 3 months)
Scale: 1500-2500 + Medical College, Patiala
allowances Oct 1968 - Jan 1982

V Principal
(Proforma Position) Medical College,
Faridkot - Since Sept.
1983
Scale Rs. 2500 + 150 SP +
allowances

VI Promoted as Director, Research Medical
Education since 1986 -
Scale 2500-2750 + allowances

Jt. VII Adviser (Health & Family Welfare)
(About 4 years) Health & Family Welfare,
Planning Commission,
New Delhi -
since January 1982

VII Adviser, Health & Family Welfare)
Planning Commission,
New Delhi.
Since 9th October 1986.
Present pay - Rs. 3000 + 400 (IR)+
Rs. 2400 (D1) + Rs. 75 (CCA) -
Total per month =
Rs. 5875-00

Job Description.. worked in various capacities with -
-Govt. of Madhya Pradesh)
-A.I.I.S., New Delhi)
-Govt. of Haryana) Since 2nd Feb 1958
-Govt. of Punjab) to-date
-Central Government) (27 years + over
9 months)

During all these assignments I was associated with the teaching and training of -

- Under-graduate students of M.B.B.S.
- Post-graduate students of M. . (S.I.M.)
- Interns
- Nurses
- Laboratory Technicians
- Radiographers
- Pharmacists
- AIIMS/LHV's etc.

During these assignments I was actively associated with Organising, Planning, Management, Monitoring & Evaluation of -

- Rural Health Services
- National Health Programmes
- Family Welfare & MCH Programmes etc.,

in the Field Practice areas attached to Medical Colleges.

- On my present assignment in the Planning Commission since January 1982 I am actively associated with the Planning/Programming/Monitoring/Evaluation of Health and Family Welfare Programmes in all the 24 states and 8 union territories. I have been conducting/chairing all the Annual Plan meetings. Visited almost all the States/UTs in the country for the assessment of the Programme Implementation. In the Planning Commission I am advisor for Indian System of Medicine/Dental Services/Nursing Services and Planning & Development of Medical and para-medical manpower in the country.

- During my assignment in the Planning Commission I have also been actively associated with Planning/Programming/ Monitoring and Evaluation of all the Health & Family Welfare Programmes of the Ministry of Health & Family Welfare.

- I have been actively associated with the formulation of the Approach to the 7th Plan for Health and Family Welfare which has been approved by the National Development Council.

- I have been actively associated with the drafting of the 7th Plan 1985-90 with particular reference to Health and Family welfare in the country. The Plan has now been approved by the National Development Council.

AWARDS

- 1. Awarded Rotary Club "Vocational Award" for excellence in "Community Medicine" in 1981-82.
- 2. Awarded "Dhanvantri Oration" instituted by "Indian Association of Preventive & Social Medicine" for excellence in Community Medicine - December 1981.
- 3. Awarded "National Oration" instituted by Andhra Pradesh Association of S.P.M. in recognition of outstanding contribution to Community Medicine - Oct. '84

- 4. Awarded the Shantilal Sheth Oration Instituted by the "Indian Academy of Paediatrics" for outstanding contribution in the service rendered for scaling up Child Survival in India - November 1985.
- 5. Awarded "B.C. Roy Award for Distinguished service" for the Development of Community Medicine - Medical Council of India.
- 6. Awarded "Dr. Wahi National Oration" By Indian Association Advancement of Medicine
- 7. Awarded "Dr. Rajan Oration" - awarded by the National Academy of Medical Sciences - New Delhi.
- 8. Awarded "Bal Gopal Medal and Oration" by the National Paediatric Society, Nepal - Khatmandu.
- 9. Fellow of the Indian Association of Preventive & Social Medicine - F.I.A.P.S.M. - 19.3.
- 10. Fellow of the Indian Society of Health Administrators, F.I.S.H.A. - 1982.
- 11. Fellow of the International Medical Sciences Academy - F.I.M.S.A. - 1981.

FELLOWSHIPS:

- Member, Medical Council of India.
- Member, I.P.H.A.
- Member, I.A.P.S.M.
- Member, I.M.A.
- Member, I.O.H.A.
- Member, National Development Council's committee on maintenance planning.
- Member, National Coordination Committees on Blindness-Tuberculosis.
- Member, Empowered Committee on Medical Education Review Committee's Report.
- Member, "Population Stabilisation & MCH" 7th Plan, Working Group, Planning Commission.
- Member, Rural & Urban Health Care, 7th Plan Working Group, Planning Commission.
- Member, Medical Education & Manpower Planning Development, 7th Plan, Working Group, Planning Commission.
- Member, Research Development - 7th Plan Working Group, Planning Commission.
- Member, Communicable Diseases Control - 7th Plan, Working Group, Planning Commission.
- Member, Non-Communicable Diseases Control/Containment Working Group - 7th Plan, Planning Commission.
- Member, ICM/ICR 7th Plan Working Group, Plg. Commission.
- Member, Governing Body of the Indian Institute of Health Management Research, Jaipur.
- Member, Governing body and Scientific Advisory Committee of the Institute of Genetics, Osmania University, Hyderabad.

- Member, ICMR's Task Forces on -
 - Health Services Research
 - Cancer Control
 - RF/RHD Control
 - CNCD Programme
- Member, Academic Council, PGI, Chandigarh.
- Member, Scientific Advisory Board, ICMR.
- Chairman, SAC, ICMR, IR, Bombay.

PUBLICATIONS/
PRESENTATIONS

Published/Presented about 78 scientific papers/key-note addresses in Journals/Conferences/Workshops/Seminars at National/International levels. One of the important publications has been an indepth report on Bihar State Family Welfare Programme conducted by me as a Consultant to Indian Institute of Management, Ahmedabad at the request of Ministry of Health/P.M. Secretariat.

INTERNATIONAL
EXPERIENCE

I have attended the following W.H.O./World Bank/ U.N.A., I.U.S.S.P sponsored Incountry/International meetings/Seminars/Conferences.

- 1971- Kathmandu - Nepal on "Family Welfare & MCH"
(WHO)
- 1983- New Delhi - India on Health Financing.
(WHO)
- 1983- Pyong Yong - North Korea on Primary Health Care.
(WHO)
- 1984 (Consultant), New Delhi - India
(WHO) Health Problems of aged.
- 1984 Attended a Seminar on Population & Development (USAL) Planning organised by R.T.I. at Washington, U.S.A.
- 1985- New Delhi - India
(WHO) Inter-sectoral Coordination on Primary Health Care.
- 1985- Attended the Annual Conference at Florence (Italy) (I.U.S.S.P) of the International Union of Scientific Studies on Population (I.U.S.S.P) held every 4 years as a special invitee.
- 1985
(World Bank, Attended a Seminar organised by Economic Development Institute of the World Bank (E.D.I.) at Columbia - U.S.A. on Population and Development Planning.

- 1986 -
(World Bank)
Safe Motherhood Conference - Nairobi.
- 1987
(Population Control.
- 1987 -
(Rockefeller Foundation)
Meeting on Population Bellagio - Italy.

TWO MAJOR
ASSETS

My two major assets as a Health Planner are:

- i. My training in Community Health experience and exposure I had with the Health & Family Welfare Programme at the grass root level in the Field Practice areas. During my posting as Professor & Head S.P.N. at Medical College, Patiala, at one time the whole District Patiala was attached to Medical College for total Health Care including National Health Programmes. During my stay in Punjab I was actively associated with the Planning/Management of Health Services in the State. During my assignments in Madhya Pradesh, AIIMS Haryana, Punjab, I was actively associated with manpower planning and development.
- ii. My tenure of over 6 years in the Planning Commission has been most educative and rewarding particularly as Head of the Division for the 1st about 2½ years. I have chaired Annual Plan discussion of all States/UTs represented by Secretaries/Directors of Health and Family Welfare Services, Ministry of Health and Family Welfare. During these discussions which were indepth in nature, a wholesome perception of health problems in India and their priorities has been developed. I have visited almost all the states in the country to know the Health and Family Welfare problems and possible solution. The assignment at the Planning Commission has given me great opportunities of learning while attending the Central Health and Family Welfare Council meetings. The perception of Health and Family Welfare within the total background of socio-economic development has been enhanced by regularly attending the internal meetings of the Planning Commission and attending the National Development Council.

My greatest asset is that I have been most actively associated with Drafting and Development of Health and Family Welfare Chapter of the 7th Plan right from its inception in Mid-1983 to the approval of the 7th Plan.

Currently I was involved in the monitoring and evaluation of the 8th Plan since its inception on 1st April 1985. I have already been actively involved in formulating the 8th National Five-Year Plan of India- Health Sector.

Dr. Harcharan Singh retired from the Planning Commission on the 31-10-90. Immediately after his retirement he worked as WHO short term consultant.

In this capacity he was working ~~to~~ with the Ministry of Health Government of Nepal and submit a report on the re-structuring of health services of Nepal in Oct. 1992.

Dr. Harcharan Singh was appointed as a member of the Expert group by the Indira Gandhi National Open University vide Vice Chancellors letter No. FVC/A-161/88 dated 20 Feb. 1988. This group is expected to work for developing distance education programme for health education in India.

BIO DATA

Dr. HARCHARAN SINGH, ADVISER (HEALTH & FAMILY
WELFARE), PLANNING COMMISSION

...

1. Dr. Harcharan Singh graduated from Medical College, Nagpur in April 1956 -
2. Dr. Singh acquired Doctorate in Community Medicines from All India Institute of Medical Sciences, New Delhi in April 1963 -
3. Having served at Medical College, Nagpur, Jubbulpore, AIIMS and Medical College, Rohtak, Dr. Singh was appointed as Professor and Head of Department of Community Medicines in October 1968. Dr. Singh was promoted as Principal, Medical College, Faridkot in 1983 and as Director, Research and Medical College, Punjab with effect from October 1985 -
4. Dr. Harcharan Singh has been awarded 6 National and International gold medals ⁱⁿ orations during the last decade -
5. Dr. Harcharan Singh is Member of the Medical Council of India and also Member of its Executive Committee,-
6. Dr. Singh was a short term consultant to the World Bank, World Health Organisation, UNICEF, Asian Development Bank on many occasions -
7. Dr. Singh has published/presented more than 150 scientific papers/key-note addresses in a large number of National and International Conferences/Seminars/Workshops -
8. Dr. Singh is a member of the National Co-ordination Committees on all the National Programmes like Family Welfare, Malaria, Tuberculosis, Leprosy, Blindness etc. -
9. Dr. Harcharan Singh had a distinction of serving as the Convenor of the 7th Five-Year Plan of the Government of India. He was member of all the 8 Working Groups and was responsible for Compiling and processing the findings of these Groups which finally became the 7th Plan Health Chapter. -
10. Dr. Harcharan Singh joined Planning Commission in January 1982 on deputation from the Government of Punjab and has been elevated as an Adviser (Health and Family Welfare) in the Planning Commission. In fact Dr. Singh is the first Technical person to be elevated in the Planning Commission to this high position -

BICDATA

PROPOSED POSITION	:	Forestry Impact Specialist
NAME	:	Bakhshish Singh
DATE OF BIRTH	:	9 January, 1934
NATIONALITY	:	Indian
EDUCATION	:	<ul style="list-style-type: none"> (i) Ph.D (Forestry) Kumaon University, Nainital 1988 (ii) M.Sc. Forestry <i>with Honours</i> Indian Forest College, Dehra Dun, 1971 (iii) B.Sc. (Forestry) <i>with Honours</i> Northern Forest Rangers College, Dehra Dun 1958 (iv) Bachelor of Science Degree Punjab University 1954
OTHER TRAINING	:	<ul style="list-style-type: none"> (i) Soil & Water Conservation Course 1961 Soil Conservation Training Centre (ii) Special Refresher Course for 1966 Forest Officers Forest Research Inst.& Colleges (iii) Forestry and Silviculture 1969 Course Forest Research Institute, Australia (iv) Forest Statistics Course 1976 Forest Research Institute, Dehra Dun (v) Forest Genetics Course 1977 Forest Research Institute Dehra Dun (vi) Management Course for Forest 1987 Officers National Inst. of Rural Development, Hyderabad.
LANGUAGE & DEGREE OF PROFICIENCY	:	<ul style="list-style-type: none"> (i) Punjabi: Read, write and speak (ii) English: Read, write and speak (iii) Hindi: Read, write and speak

MEMBERSHIP OF PROFESSIONAL SOCIETIES

- (i) Association of Soil & Water Conservation of India
- (ii) Society of Indian Foresters
- (iii) Society of Tropical Forestry Scientists, India
- (iv) Indian Society of Tree Scientists
- (v) Arid Zone Research Association of India
- (vi) Indian Forest Service Association
- (vii) Indian Science Congress
- (viii) Visiting Fellow to the Dept. of Forestry, Kumaon University
- (ix) International Union of Forestry and Research Organisation
- (x) Nitrogen Fixing Tree Association
- (xi) Minor Forest Products for Rural Development & Environmental Conservation, India.

COUNTRIES OF WORK EXPERIENCE : India and Nigeria

EMPLOYMENT RECORD : Details enclosed in Annexure A.

DETAILED TASKS ASSIGNED : Forestry Impact Specialist

CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : *R. Alimurad Singh*

DATE OF SIGNING : 31 / 01 / 1992
DAY MONTH YEAR

BIODATA OF DR. BAKHSHISH SINGH

1. Name : BAKHSHISH SINGH

2. Present Mailing Address:

3. Permanent Home Address: 1594, SECTOR 36-D,
CHANDIGARH, INDIA

4. Date of Birth: 9TH JANUARY, 1934.

5. Place of Birth: Jalandhar (Punjab), India.

6. Citizenship: Indian

7. Sex: Male

8. Marital Status: Married

9. QUALIFICATION: Ph.D. (Forestry); M.Sc. Forestry (AIFC) with Honours and First Position; Forestry and Silviculture Course (Australia); Soil and Water Conservation Course with First Position; Forest Genetics and Statistics Courses, Management Course.

FOR DETAILS PLEASE SEE ANNEXURE - I

10. ACADEMIC AWARDS AND PRIZES:

- (1) Director of Commonwealth Forestry Bureau, Oxford (U.K.)'s prize for standing First in the Indian Forest College (M.Sc. Forestry Course), Dehra Dun in 1969-71.
- (2) Minister of Agriculture (and Forests)'s prize for the top student of the Indian Forest College, 1969-71.
- (3) Hill Memorial prize for the top student in Silviculture subject at the I.F.C; 1969-71 course.
- (4) K.L. Aggarwala's prize for the top student in Soil Cons. and Range Management at the I.F.C; 1969-71 Course;
- (5) K.P. Sagrelya's Shreshta Vanika prize for the top student in Forestry Subjects at the I.F.C; 1969-71.
- (6) College prize for topping in the Botany subject of 1969-71 course at the Indian Forest College (M.Sc. Forestry), Dehra dun.

- (7) Indian Forester's prize for securing First Position in the 1969-71 M.Sc. Forestry course of the I.F.C; Dehradun.
- (8) Prize for the Best all-round student and the Most Practical Forester of the 1969-71 course of the I.F.C; Dehradun.
- (9) Prize for winning the Essay Writing Competition in the Forest Colleges.
- (10) Brandis prize for the Best Research Paper contributed to the Journal of Indian Forester during the year 1977.
- (11) Bagged six prizes in the Photography Competition of the Indian Forest Colleges for the year 1970-71.
- (12) Was awarded the Trophy for winning the Marathon Race (Cross Country) of Forest Colleges, Dehradun.
- (13) Was awarded cups (trophies) for winning the 1500m and 800m races of the Forest Research Institute & Colleges, Dehra dun's Annual Sports.

11 Scholarships:

- (1) Was awarded the Colombo Plan Fellowship/Scholarship of the Government of Australia in 1969 to undergo the course on "Forestry and Silviculture", Australia.
- (2) Was awarded the Currie Scholarship of the Government of U.K. in 1971 on having secured First Position in the M.Sc. Forestry course of the Indian Forest College, Dehradun.

12 Languages Known:

LANGUAGE	READ			WRITE			SPEAK					
	Ex.	Good	Fair	Slight	Ex.	Good	Fair	Slight	Ex.	Good	Fair	Slight
1. Punjabi	X	-	-	-	X	-	-	-	X	-	-	-
2. English	X	-	-	-	X	-	-	-	X	-	-	-
3. French	-	X	-	-	-	X	-	-	-	-	X	-
4. Persian	-	X	-	-	-	X	-	-	-	-	X	-
5. Urdu	X	-	-	-	-	X	-	-	-	X	-	-
6. Hindi	-	X	-	-	-	X	-	-	-	X	-	-

13. FIELDS OF SPECIALISATION AND EXPERIENCE:

- (i) Projects Formulation, Monitoring, Coordination, Appraisal, Feasibility Studies and Assessment etc. - 9 yrs.
- (ii) Soil Conservation, Watershed Management, Agro-forestry, Soc. Forestry, Grassland Development etc. - 20 yrs.*
- (iii) Silvicultural Research, Plant Introduction, Biomass Production and Nutrient Cycling, Afforestation of Arid and Degraded Areas, Desert Control, Environmental Conservation etc. - 21 yrs.
- (iv) Forestry Education and Teaching etc - 25 Yrs.*
- (v) Organising Seminars and Conferences etc. - 10 Yrs.*
- (vi) Tropical and Savannah Forestry (in Nigeria) - 5 Yrs.

* _Stands for overlapping period

FOR DETAILS PLEASE SEE PAGES 4 TO 10

14. Membership of Professional Societies / Associations;

- (1) Life member of the Association of Soil & Water Conservationists of India;
- (2) Life member of Society of Indian Foresters;
- (3) Member of the Soc. of Tropical Forestry Scientists, India;
- (4) Member of the Indian Society of Tree Scientists;
- (5) Member of the Arid Zone Research Association of India;
- (6) Member of the Indian Forest Service Association;
- (7) Member of the Indian Science Congress;
- (8) Visiting Fellow to the Department of Forestry, Kumaon University, India;
- (9) Member of the International Union of Forestry and Research Organisation (IUFRO);
- (10) Associate member of the Nitrogen Fixing Tree Association (NFTA), USA.
- (11) Member Society of Minor Forest Products for Rural Devt. & Environmental Conservation, India.

15. Publications:

Have over 100 publications to my credit on varied aspects of Forestry, Soil Conservation, Watershed Management, Agro-forestry, Silvicultural Research, Afforestation and Forestry Education, etc.

Have prepared over 10 Watershed Management Projects and Management Plans being funded by the World Bank, European Economic Community etc. in the Himalayan region of India;

Wrote some chapters of the Book- Handbook of Afforestation, by R.C. Ghosh, Forest Research Institute of India.

Was invited to write chapter on Afforestation and Rural Development, for the Book titled- Economic Revolution in India; of the Himalayan Publishing House, Bombay, for the Govt. of India's 20- Point Development Programme.

For Details please see the List Attached

16. Brief Employment History:

S.N.	Name of the Post	From	To	Employers	Reasons for Leaving.
1.	Research Assistant (Forestry)	2.4.58	19.5.64	Soil Conserva- tion Board of India.	Selection to higher post
2	Senior Research Assistant (F)	20.5.64	21.8.64	Central Arid- Zone Research Instit; Jodhpur (Govt.of India)	-Do-
3.	Asst.Soil Conser- vation Officer and Head Forestry Branch.	22.8.64	11.9.69	Soil Conserva- tion Board of India and Ind. Council Agric.Res.	Selection to Indian Forest Serv.
4.	Asst.Silviculturist U.P. State.	12.6.69	10.2.74	U.P.State,Forest Department.	Selection to higher post.
5.	Asst.Silviculturist to Govt.of India.	11.2.74	21.11.77	Forest Res.Inst;Assignment Dehra Dun	in NIGERIA.
6.	Senior Forest Officer and Head Forest Department	22.11.77	31.3.80.	U.B.River Basin Dev.Authority, NIGERIA	Promotion
7	Principal Forest Officer and Head Forest Dept.	1.4.80	28.9.82	UBRBDA, NIGERIA	Return from Foreign Assignment
8.	Silviculturist, U.P. State	29.9.82	25.6.84	Forest Dept; U.P.State,India	Transfer
9.	Asst.Chief Conser- vator of Forests (Management)	26.6.84	12.10.85	-Do-	Promotion
10.	Director and Conservator of Forests, Forestsry Training Institute,U.P.	13.10.85	31.7.88	-Do-	Transfer
11.	Conservator of Forests, Working Plans Circle,U.P.	1.8.88	28.6.89	-Do-	-Do-
12.	Proj. Director, Landuse Survey Directorate,U.P.State.	29.6.89	31.1.92	-Do-	Retirement from Indian For Service

17. DETAILS OF PROFESSIONAL EXPERIENCE: Starting from the present most recent post, to back in the past.

(1) Title of Post:Project Director

Land Use Survey Directorate, Forest Dept;U.P.

From :20.6.1989

To:31.1.1992

Type of Job: Watershed Management and Forestry Specialist.

Employer:Indian Forest Service,Forest Department, Uttar Pradesh State.

Salaries Per Annum: Starting- Rs.78,000
Latest- Rs.98,000

Nature of Duties:

- (1) To identify, plan and formulate Integrated Watershed Management Projects and Schemes for the Himalayan Sub-watersheds in Northern India;
- (ii) Monitoring ,appraisal,feasibility studies and coordination of different projects concerning soil conservation ,afforestation, rural development , pasture development, environmental conservation etc.
- (iii) To participate in the activities of the State Land-Use Planning Committee for preparing long term perspective Land Use Policy for Himalayan region
- (iv) To maintain a Data Bank on land and water resources of the State, based on Landset imagery & ground surveys, for land use and vegetation, land capability classification, and the socio-economics etc. of different watersheds.
- (v) To impart training to the Project staff .

(2) Title of Post:Conservator of Forests From: 1.8.1988
Working Plans Circle, To : 28.6.1989
Nainital(U.P.),INDIA

Type of Job: Forest Management & Planning.

Employer:Indian Forest Service, Forest Department, Uttar Pradesh State

Salaries Per Annum:Starting - Rs.65,000; Final-Rs.70,000
Nature of Duties

- (i) Coordination ,planning and formulation of 10 years Management Plans for different forest areas and Social Forestry Divisions in the State;
- (ii) Mid term review and periodic appraisal of the implementation of the current Management Plans and Scheme;

(iii) To monitor and supervise the implementation of the Management Plans in terms of Silvicultural prescriptions, yield regulation, regeneration and protection etc. of the natural forests and plantations;

(iv) To maintain Data Bank for Land-Use, vegetation, biomass production from different forests & plantations, and market trends etc.

(3) Title of post: Director & Conservator of Forests, Forestry Training Institute, U.P. India.

From: 13.10.1985 To: 31.7.1988

Type of Job: Forestry Education and Training.

Employer: Indian Forest Service, Forest Department

Salaries Per Annum: Starting -Rs.54,000; Final-Rs.62,000

Nature of Duties:

(i) To plan, coordinate and implement the Training Programmes for Forestry personnel of different States in India.

(ii) To organise and conduct short Courses, Seminars and Workshops for different categories of officers & staff of the Forest and the Community & Rural Development departments;

(iii) To develop teaching aids, models, publications, and syllabus etc. for the Forest Colleges;

(iv) To teach Forestry and management subjects to the trainees at the Forestry Training Institute and conduct their study tours to different areas and projects.

(4) Title of Post: Assistant Chief Conservator of Forests (Management), U.P. State

From: 26.6.84 To: 12.10.85

Type of Job: Forest Management and Coordination

Employer: Indian Forest Service, Forest Department, U.P. State India

Salaries per Annum: Starting Rs.45,000, Final-Rs.50,700

Nature of Duties: To assist the Chief Conservator of Forests (Management) for:-

(i) Coordination, formulation and appraisal of Management Plans for different forest areas and Social Forestry Projects in the State;

(ii) Monitoring, implementation of different Plans and Projects in the State for afforestation, environmental conservation, forest logging & utilisation, protection (from fires, encroachments etc.) and rural development etc;

(iii) Fixation of royalty (sale price) for timber and various forest produce for marketing;

(iv) Preparation of State Progress Reports on different aspects of forest management and development.

(5) Title of Post: Silviculturist U.P. State

From: 29.9.82 To: 25.6.84

Type of Job: Forestry Research

Employers: Indian Forest Service, Forest Department, U.P. State

Salaries Per Annum: Starting - Rs. 40,000, Final - Rs. 43,500

Nature of Duties:

- (i) To plan, conduct and coordinate Research on various aspects of forest management & development; such as plant introduction, standardisation of nursery & planting techniques, tree improvement & breeding, seed certification, assessment of biomass production & nutrient cycling in tree crops; species suited to Social Forestry and Range Management etc;
- (ii) Analysis and appraisal of Research Projects for developing a package on practices for adoption in extension forestry;
- (iii) To compile, prepare and edit Research Reports, technical publications, monograms and handbooks etc. based on the research findings of experiments;

(6) Title of post: Principal Forest Officer and Head of Forest Deptt.

From: 1.4.80 To: 28.9.82

Type of Job: Forestry and Watershed Management Expert.

Employers: U.B. River Basin Development Authority, Yola, Nigeria.

Salaries Per Annum: Starting- Naira 7,980

Final - Naira 10,800

Nature of Duties:

I. As Forestry Expert:

- (i) To identify, plan and formulate Watershed Management Projects for Savannah Region Catchment of Benue river system,
- (ii) To conduct and appraise Feasibility Studies and Reports on Projects for Afforestation, Soil Conservation, Agro-forestry etc.

II As Head of Department:

To Administer, coordinate, and supervise the implementation of the Water-shed Management Projects.

III. As Member of the Management Committee

To monitor and appraise the ongoing projects; assess the technical, financial and economic viability of the proposed projects.

(7) Title of Post: Senior Forest Officer and Head of Forest Dept.
From: 22.11.77 To: 31.3.80
Type of Job: Forestry and Watershed Management Expert.
Employers: U.B. River Basin Development Authority, Yola,
Nigeria.
Nature of Duties: As under item 6, above.

(8) Title of Post: Assistant Silviculturist to the Govt. of India
From: 11.2.74 To: 21.11.77
Type of Job: Forestry Research (National Level)
Employers: Forest Research Institute and Colleges (Govt. of
India) Dehradun.
Salaries Per Annum: Starting Rs. 30,000, Final-Rs. 36,000
Nature of Duties:
(i) To plan, conduct and coordinate Research on
varied aspects of Forestry with special
emphasis on nursery & afforestation techniques,
plant introduction, Social forestry,
forest management etc. in different regions
of India.
(ii) To identify, formulate and appraise Forestry
Research Projects for various agro-climatic
regions of India;
(iii) To organise and conduct Seminars, Workshops,
Conferences etc;
(iv) To compile, summarise and prepare Country
Reports on Forestry Research;
(v) To edit and publish technical papers &
proceedings of Seminars and Conferences etc.
(vi) Imparting specialised training, to the
officers and Forestry personnel of India
and other countries at the Forest Colleges of
the Institute.

(9) Title of Post: Assistant Silviculturist Uttar Pradesh
State
From: 12.6.69 To: 10.2.74
Type of Job: Forestry Research (State Level)
Employer: Indian Forest Service, Forest Dept; U.P. State
Salaries per Annum: Starting-Rs. 18,000; Final-Rs. 25,000
Nature of Duties:

- (i) To plan, conduct and coordinate Research on
varied problems and aspects of Tropical and
Sub-tropical Forestry, including nursery and
planting techniques, plant introduction, tree
improvement, rehabilitation of degraded and
understocked forests, agroforestry and water-
shed management etc..
- (ii) To monitor and administer implementation of
Research Projects and schemes..
- (iii) Compilation, computation and analysis of
quantitative research data and preparation
of research reports, notes and publications etc

(10) Title of Post: Assistant Soil Conservation Officer
(Forestry)

From: 22.8.64 To: 11.6.69

Type of Job: Soil Conservation and Watershed Management.

Employers: Soil Conservation Research, Demonstration and Training Institute, Govt. of India, Dehradun.

Salaries Per Annum: Starting-Rs.15,000 Final- Rs.20,000

Nature of Duties:

- (i) To Plan, conduct and guide Research on varied aspects of Soil & Water Conservation and Forestry, with special emphasis on reclamation of degraded areas, Farm-forestry, Grassland development, Watershed Management;
- (ii) To administer and implement Projects for soil Conservation and Watershed Management, Grassland improvement and Agro-forestry etc;
- (iii) To impart Training(teaching) in Soil Conservation and Watershed Management to staff and Officers of Agriculture and Forest departments of different States in India and of the Afro-Asian countries,
- (iv) Preparation and publication of Project Reports, Research Reports, Technical Bulletins and Teaching aids etc.

(11) Title of Post: Senior Research Assistant (F)

From: 20.5.64 To: 21.8.64

Type of Job: Desert Control and Arid Zone Afforestation

Employers: Central Arid Zone Research Institute
Govt. of India, Jodhpur (Rajasthan)

Salaries Per Annum: Starting- Rs. 12,000

Final- Rs. 14,000

Nature of Duties:

- (i) Afforestation, rehabilitation, Grassland development & Range Management in the degraded and eroded Arid Lands of the Rajasthan Desert in India;
- (ii) To establish Demonstration Areas for Desert Control and Afforestation;
- (iii) To plan and conduct Research studies for reclamation and rehabilitation of degraded arid lands through vegetative and engineering measures;
- (iv) Compilation and analysis of data for writing of Research Reports, notes, and research papers for publication.

(12) Title of post: Research Assistant From 2.4.58 To 19.5.64
(Forestry)

Type of Job: Soil Conservation and Watershed Management.

Employers: Soil Conservation Research, Demonstration and Training Institute, Govt. of India, Dehradun.

Salaries Per Annum: Starting Rs.8,000 Final Rs.10,000

Nature of Duties:

- (i) To conduct Research and Extension work on varied aspects of Soil & Water Conservation with emphasis on watershed Management, Afforestation,, Agroforestry, Grassland Development and reclamation of Degraded Areas;
- (ii) To impart training (Teaching) in soil Cons. and Watershed Management to the staff of Agriculture and Forest departments of different States in India and the Afro-Asian Countries;
- (iii) Computation and analysis of field data for publication of Research Reports, notes and papers etc.

I certify that the statements made by me and the facts given above are true and correct to the best of my knowledge and belief.

Date:

(BAKHSHISH SINGH)

Education:**ANNEXURE-I**

Name and Place	Years Attended	Degrees and Academic Distinctions	Main Subjects
1. Punjab Univ. Chandigarh, India	4/1950 3/1954	Bachelor of Science Degree	Chemistry, Physics, English etc.
2. Northern Forest Rangers College, For. Res. Instt; (Govt. of India) Dehra dun.	4/1956 3/1958	B.Sc. Forestry (Forest Rangers Course) with HONOURS Award for the Best Practical Forester.	Forestry and Allied subjects, including Soil Conservation, Watershed Management etc.
3. Indian Forest College; (Govt. of India) Dehra dun.	6/1969 6/1971	M.Sc. Forestry (Associateship of Indian Forest College) with HONOURS	Forestry and allied subjects. and FIRST POSITION.
4. Kumaon Univer- sity, Nainital India.	10/1983 10/1988	Ph.D. Forestry (Botany)	Silvicultural Practices, Biomass Production and Nutrient cycling in Poplar Plantations
5. Soil Conservation Training Centre, (Govt. of India) Hazaribagh	2/1961 7/1961	Soil & Water Conservation Course with FIRST POSITION	Soil & Water Conservation, Watershed Management, Forestry, Engg; Range Management etc.
6. Forest Research Inst. & Colleges (Govt. of India), Dehra dun.	7/1966 12/1966	Special Refresher Course for Forest Officers with FIRST POSITION	Advances in Forests Technology and Management
7. Forestry and Timber Bureau; Forest Research Institute, AUSTRALIA	2/1969 6/1969	Forestry and Silviculture Course (AUSTRALIA)	Afforestation, Tree improvement, Watershed Management, Protection, etc.
8. Forest Research Institute, Dehra Dun, India	1.9.76 21.9.76	Forest Statistics Course	Forest inventories, Design of Experiments, Analysis of Data etc
9. -Do-	10/77 11/77	Forest Genetics Course	Tree breeding, propagation, seed orchards, seed certification etc.
10 National Inst. of Rural Development Hyderabad, India	2.2.87 8 2.87	Management Course for Forest Officers	Modern Management concepts, Extention Techniques and evaluation of development projects

LIST OF PUBLICATIONS OF DR. BAKHSHISH SINGH

**I. Soil & Water Conservation, Rehabilitation /Afforestation
Of Arid & Degraded areas, Desert Control, Stabilisation
of Land Slides and Stream Bank Erosion, etc.**

1. Bakhshish Singh (1966) A review of Ravine Reclamation Works in India; THESIS, SPECIAL REFRESHER COURSE FOR FOREST OFFICERS, Forest Research Institute Dehra Dun, pp.173

2 Bakhshish Singh (1971) A comparative study on Economics of various Soil Conservation-cum-Grassland Improvement Practices in Ravine Lands-II, INDIAN FORESTER , 97(7):388-391.

3. Bakhshish Singh (1971) Ravines Problem in India, their causes, cure and Reclamation; THESIS, INDIAN FOREST COLLEGES Dehra Dun , pp.154.

4. Bakhshish Singh (1972) Reclamation of Ravine Lands through Afforestation. SYMPOSIUM ON MAN-MADE FORESTS IN INDIA, Dehra Dun June 1972, pp.III C 48-54.

5. Bakhshish Singh (1972) Economics of Afforestation of Ravine Lands SYMPOSIUM ON MAN-MADE FORESTS IN INDIA, Dehra Dun , June 1972, pp.II 26-32.

6. Bakhshish Singh (1975) The problems of Afforestation and Pasture Development in the Rajasthan Desert. WORKSHOP ON PROBLEMS OF THE DESERTS IN INDIA, Jaipur, 16-18 Sept.1975

7 Bakhshish Singh (1975) Prospects of Afforestation and Pasture Development in the Rajasthan Desert. WORKSHOP ON THE PROBLEMS OF THE DESERTS IN INDIA; Jaipur , 16-18 Sept.1975.

8. Bakhshish Singh (1977) Some thoughts and suggestions for Afforestation and Grassland Development in the Indian Desert. SEMINAR ON DESERT AFFORESTATION AND GRASSLAND DEVELOPMENT, Bhiwani, Haryana, India, 10-12 October, 1977; pp. 95-106

9. Bakhshish Singh, Mathur, Vegetative and Engineering measures H.N. & Gupta, S.K. (1971) for Torrent Training and Stream Bank Protection in the Doon Valley; INDIAN FORESTER, 97 (1) : 47-54.

10. Bakhshish Singh, Mathur Kudzu cultivation for Soil H.N. & Joshi, P. (1968) Conservation, Grassland Development and Paper Industry; SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Soc. of Indian Foresters, Dehra Dun Nov; 1968.

11. Bakhshish Singh, Mathur, Comparative effect of grasses and H.N., & Joshi, P. (1979) legumes for checking Run-off and Soil Loss on Sloping Lands in Doon Valley. JR. SOIL & WATER CONSERVATION, INDIA, Dehra Dun.

12. Bakhshish Singh, Bhabar Plantations on Wastelands in Mathur, H.N. & Mehta the Sub-Himalayan tract for Paper and S.S. (1968) rope making Industry is a paying and Protective Land use. SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Society of Indian Foresters, Dehra Dun Nov. 1968.

13. Bakhshish Singh, Acacia species for Afforestation of Pradhan, J.P. and Ravine Lands. SYMPOSIUM ON MAN-MADE Dayal, R.B. (1972) FORESTS IN INDIA, Dehra Dun, June, 1972, pp. III A-24-31.

14. Bakhshish Singh and A comparative study of the Economics Verma, B. (1971) of various Soil Conservation-cum- Grassland Improvement practices for rejuvenating Forage Production in Ravine Lands-I (Forage Production). INDIAN FORESTER, 97(6); 315-321.

15 Bakhshish Singh, Verma Afforestation and Grassland Improvement in Ravine Lands for small scale Industries and Dairy Development-I. SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Soc. of Ind. Foresters, Dehra dun, Nov; 1968.

16. Bakhshish Singh, Verma, B. and Monoppa, K. (1968) Afforestation and Grassland Improvement in Ravine Lands for small scale Industries and Dairy Development -II (Economics Discussed). SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Soc. of Ind. For; Dehra Dun, November, 1968.

17. Bakhshish Singh, Verma B; and Pandya J S. (1966) Studies on some grasses and legumes for selection as suitable for Ravine Reclamation works in Gujarat. TENTH ANNUAL MEETING OF THE SOIL CONSERVATION SOCIETY OF INDIA; Bhubneshwar, October 1966.

18. Bhaskaran, A.R.; Baksji, S. De. and Bakhshish Singh (1964). Annual Research Report of soil Conservation Research Demonstration & Training Centre, Vasad. MINISTRY OF AGRICULTURE (Govt. of India), New Delhi.

19 Dalal, S.S.; Patnaik, N; and Bakhshish Singh (1964) Grasses for Waterways; JR.OF AGRICULTURAL RESEARCH, I.C.A.R.; New Delhi, 4(3); Sept.1964

20. Dalal, S.S., Patnaik, N and Bakhshish Singh (1965) Comparative performance study of eight Grasses for their use in Waterways; INDIAN FORESTER, 91(7). 498-504.

21. Gupta, S.K.; Mathur, H N. & Bakhshish Singh () Erosion control on mountain roads; communicated to INDIAN FORESTER.

22. Gupta, S.K., Mathur, H.N., Bakhshish Singh, & Tejwani, K.G. (1968) Landslide problem of Outer Himalayas and their control meaure. USAID/UNIVERSITY OF ILLINOIS-U.P.RETURNED PARTICIPANTS SEMINAR; Lucknow (India): Sept.-Oct; 1968, pp. 39-47.

23. Gupta, S.K. Mathur, H N, Bakhshish Singh and Tejwani, K.G. (1969) Landslides Stabilisation works in Mussoori Hills. Presented at the Meeting of the INDIAN SOCIETY OF AGRICULTURAL ENGINEERS; Pant Nagar (U.P.); February, 1969.

24. Verma, B; Bakhshish Singh, and Kamannwar H.K.(1968) Classification and treatment of Ravines of Gujarat. SYMP. ON RECLAMATION AND USE OF WASTELANDS IN INDIA, National Institute of Sciences of India, New Delhi, May 1968,pp.35-41.

25. Verma, B;Bakhshish Singh and Monappa, K. () Economics of vegetative reclamation measures in the Mahi Ravines of Central Gujarat; communicated to the INDIAN FORESTER;

26. Verma, B; Bakhshish Singh,Saraf,H.N., and Monappa,K (1969) Suitability and Economics of Grasses for reclamation and stabilisation of Mahi Ravines in Gujarat; INDIAN FORESTER , 95(1) : 33-44.

27. Mathur , H.N., Gupta,S.K; Bakhshish Singh and Tejwani, K.G. (1969) Afforestation of Nalota Nala Landslip. NATIONAL SEMINAR ON SOIL EROSION AND STABILIZATION OF HILL SLOPES ALONG HILL ROADS (VOL.II), Border Roads Organisation, New Delhi.

II. AGRO-FORESTRY, SOCIAL FORESTRY, GRASSLAND/PASTURE DEVELOPMENT, FODDER PRODUCTION, RURAL DEVELOPMENT, AND PEOPLES PARTICIPATION ETC.

28. Bakhshish Singh (1964) Role of Mulberry in Community Development Programme of the Sub-Himalayan tract. FOREST REANGERS COLLEGES MAGAZINE , DEHRA DUN, pp.42-45.

*29. Bakhshish Singh (1971) A Comparative study on Economics of various Soil Conservation-cum-Grassland Improvement Practices in Ravine Lands-II. INDIAN FORESTER, 97(7) :388-391.

30. Bakhshish Singh (1976) Social Forestry for integrated Rural Development. INDIAN SCIENCE CONGRESS, 63rd Session , Waltair, India , Jan; 1976.

31. Bakhshish Singh (1976) Social Forestry can be a turning point in the Rural Development. WORKSHOP -CUM- SEMINAR ON SOCIAL FORESTRY , Gandhinagar, Gujarat, India, February,1976.

32. Bakhshish Singh (1976) Grassland Development in Village Wastelands. WORKSHOP-CUM-SEMINAR ON SOCIAL FORESTRY , Gandhinagar, Gujarat, India. Feb; 1976.

33. Bakhshish Singh (1977) Afforestation and Rural Development. Chapter P5-2 of the Book- "ECONOMIC REVOLUTION IN INDIA." Pub. Himalaya Publishing House , Bombay, pp544-551.

34. Bakhshish Singh (1977) Perspective of Forest Development in Western Himalayan Region. SEMINAR ON PEOPLE AND FORESTS; Dehra Dun, 16-17 January,1977.

35. Bakhshish Singh and Dalal, S.S.(1963) Farm Forestry Planning for the Doon Valley. FOREST RANGERS COLLEGES MAGAZINE,DEHRA DUN,pp.39-44.

36. Bakhshish Singh,Majumdar S.K.,and Verma, B.(1968) Effect of various Cultural Operations with or without seeding and fertiliser, on Grassland Development in Ravine Lands. INDIAN FORESTER, 94(6):463-473.

*37 Bakhshish Singh,Mathur H.N. and P. Joshi (1968) Kudzu cultivation for Soil Conservation , Grassland Development and Paper Industry. SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Soc.of Indian Foresters, Dehra dun, Nov; 1968.

38. Bakhshish Singh, Mathur, H N. and Joshi,P.(1968) Farm Forestry and Sericulture Industry to improve the lot of Rural India. SYMP. ON FOREST AND FOREST BASED INDUSTRIES , Society of Indian Foresters, Dehra Dun Nov; 1968.

39. Bakhshish Singh, Mathur, H.N. and Joshi, P.(1980) Effect of Tree Shade on Grassland Production in Moist Sub-tropical region of Northern India.INDIAN JR. FORESTRY, 3(4):345-348

*40. Bakhshish Singh, and Verma B. (1971). A comparative study of the Economics of various Soil conservation-cum-Grassland Improvement practices for rejuvenating Forage Production in Ravine Lands-I (Forage Production). INDIAN FORESTER, 97(6);315-321.

41. Bakhshish Singh ,Verma,B; and Monappa, K.(1970) Effect of Fertilisers on Forage Production in Ravine Lands. INDIAN FORESTER, 96(4); pp.293-300.

*42.Bakhshish Singh, Verma, B. and Monappa K.(1968) Afforestation and Grassland Improvement in Ravine Lands for Small scale Industries and Dairy Development -I.SYMP. ON FOREST AND FOREST BASED INDUSTRIES, Soc. of Ind. For; Dehra dun, November, 1968.

*43. Bakhshish Singh,Verma B. and Monappa,K.(1968) Afforestation and Grassland Improvement in Ravine Lands for small scale Industries and Dairy Development -II (Economics Discussed). SYMP. ON FOREST AND FOREST BASED INDUSTRIES ; Soc.of Indian For; Dehra Dun, November,1968.

44. Ghosh, R.C; and Bakhshish Singh (1976) Some thoughts for Rationalisation, Research, and Organisation in Social Forestry; WORKSHOP-CUM-SEMINAR ON SOCIAL FORESTRY, Gandhinagar, Gujarat, February,1976.

III. SILVICULTURAL RESEARCH, NURSERY AND PLANTING TECHNIQUES, PLANT INTRODUCTION, TREE IMPROVEMENT, AND AFFORESTATION STUDIES ETC.

45. Bakhshish Singh (1973) Effect of different lengths of cuttings on the growth and survival of Poplars in nursery. FORESTRY CONFERENCE, DEC; 1973, Dehra dun.

46. Bakhshish Singh (1973) Annual Research Report, Silviculture Division, Sal Region, U.P. FOREST DEPARTMENT, Nainital India, 65p.

47. Bakhshish Singh (1976) Nursery Technique for Pines. A Handout circulated to State Forest Departments, FOREST RESEARCH INSTITUTE, Dehra dun.

48. Bakhshish Singh and Mathur, H.N. (1968) Propagation of Kudzu vine. TECHNICAL NOTE, SOIL CONSERVATION RESEARCH INSTT; Dehra Dun.

49. Bakhshish Singh, Mathur R.B. (1973) Results of preliminary trials of Kadam in the Tarai region of Eastern Uttar Pradesh. FORESTRY CONFERENCE, Dehra dun , Dec; 1973.

50. Bakhshish Singh and Mathur, R.B.(1973) Flowering, Fruiting and Seeding behaviour of Semaal Seed Orchard at Ranipur in Uttar Pradesh. FORESTRY CONF; Dehra Dun , Dec. 1973.

51. Bakhshish Singh and Mathur,R.B.(1973) Natural Regeneration of Eucalyptus hybrid in Uttar Pradesh. FORESTRY CONF; Dehra dun December , 1973.

52. Bakhshish Singh, Mathur,R.B. and Singh, K.N.(1973) Effect of different times of Planting of Cuttings on Growth and Survival of Poplar in Nursery. FORESTRY CONF; Dehra dun , December, 1973.

53. Bakhshish Singh, Mathur, R.B., and Srivastava, R.C. (1973) Results of performance of some Italian, American and Australian clones of Poplars in Tarai soils of Uttar Pradesh. FORESTRY CONFERENCE, Dehra Dun, December, 1973.

54. Bakhshish Singh and Monappa, K (1968) Effect of different depths of planting and manuring on the growth and survival of Poplars in the Ravine lands-I. INDIAN FORESTER, 94(9): 675-681.

55. Bakhshish Singh, Monappa K; and Mistri, M.S. (1969) Effect of different depths of planting and manuring on the growth and survival of Poplar in the Ravine Lands-II (Water Balance-cum-Growth Studies). INDIAN FORESTER, 95(8) :532-538.

* 56. Bakhshish Singh, Pradhan, J.P. and Dayal, R.B. (1972) Acacia species for Afforestation of Ravine Lands. SYMPOSIUM ON MAN-MADE FORESTS IN INDIA, Dehra dun, June, 1972, pp.III A-24-31.

57. Bakhshish Singh, Pradhan, J.P. and Singh, A. (1977) Effect of different types and times of mulching on the success and economics of Afforestation in Semi-Arid Ravines tract of Gujarat. INDIAN FORESTER, 130(2);120-128.

58. Bakhshish Singh, Verma, B; and Monappa, K. (1967) A study on growth performance and volume production of some Eucalyptus species for Fuel Reserves in the Ravine Lands-I; VAN VIGYAN (JR. SOCIETY OF INDIAN FORESTERS; Vol.5, No.3 and 4, Sept.- Dec.1967, pp.85-94.

59. Bakhshish Singh, Verma, B; and Monappa, K. (1969) A Study on the growth performance of some Eucalyptus species for Development of Fuel Reserves in Ravine Lands -II; VAN VIGYAN (Jr. Soc. of Indian Foresters); 7(1&2): 12-18, March-June, 1969.

60 Bakhshish Singh, Verma, B; and Monappa, K. (1968) Results of some Nursery and field trials on the Introduction of Poplars in Ravine Lands. VAN VIGYAN (Jr. soc. of Indian Foresters); 6 (1 & 2) : 28-42; March-June, 1968.

61. Bakhshish Singh, Verma, B; and Patel,A.P.(1972) Mortality of Eucalyptus Plantations in the Ravine Lands. SYMP. ON MAN-MADE FORESTS IN INDIA, Dehra Dun. June 1972, pp.III C 64-70.

*62. Bhaskaran, A.R.; Baksi,S De.,and Bakhshish Singh(1964) Annual Research Report of Soil and Water Conservation Research, Demonstration & Training Centre, Vasad. MINISTRY OF AGRICULTURE (Govt. of India), New Delhi.

63. Dalal,S.S and Bakhshish Singh (1962) Introduction of Poplars in Tropical Habitat. SYMP. ON EVALUATION OF TROPICAL HABITAT FOR PRODUCTION OF FOOD, FODDER, FUEL AND FERTILISERS; International Soc. of Tropical Ecology, Cuttack (India), June 1962.

64 Dalal, S.S. Patnaik,N; and Bakhshish Singh (1962) Preliminary trials of Poplars. INDIAN FORESTER; 88(8): 552-559.

65. Ghosh, R.C; and Bakhshish Singh (1975) National Report on activities related to Poplar and Willow cultivation , exploitation and utilisation in India. 15TH SESSION INTERNATIONAL POPLAR COMMISSION, 1971-74; National Poplar Commission , New Delhi, pp 36.

66. Ghosh, R.C.,and Bakhshish Singh (1975) Poplar and Willow cultivation, exploitation and Utilisation in India. Report for 1971-74 of the National Poplar commission of India, presented at the 15th Session of the INTERNATIONAL POPLAR COMMISSION, Rome.

67. Ghosh, R.C.,Bakhshish Singh and Sharma K.K. (1976) Optimum depth of sowing for Propagation of Tropical Pines. INDIAN FORESTER;102 (9):555-567.

68 Ghosh, R.C.,Bakhshish Singh and Sharma K.K, (1976) Effect of seed grading by size on germination and growth of Pine seedlings. INDIAN FORESTER; 102 (12): 850-858.

69. Ghosh, R.C., Bakhshish Singh and Sharma K.K. (1977) Suitability and Economics of Bag size for raising seedlings of ; *Pinus patula* and *P. caribaea*. INDIAN FORESTER, 103 (12):773-786.

70. Ghosh, R.C., Bakhshish Singh and Sharma K.K. (1977) Control of damping off in Pine Nurseries through seed dressing with fungicides. INDIAN FORESTER; 107(4):220-226

71. Ghosh, R.C; Bakhshish Singh and Sharma K.K. (1977) Optimum spacing of planting cuttings for propagation of Poplars in the Nursery. INDIAN FORESTER.

72. Ghosh, R.C., Bakhshish Singh and Sharma K.K. (1977) Suitability trials of different species and provenances of Pines in the Doon Valley of India. INDIAN FORESTER; 107(3):135-150.

73. Ghosh, R.C., Bakhshish Singh and Sharma K.K. (1977) Control of Lantana in forest plantations through application of chemical Weedicides. INDIAN FORESTER.

74. Ghosh, R.C., Bakhshish Singh and Uma Dutt Dhondiyal (1977) Control of Eupatorium weed in Forest Plantations through application of chemical weedicides. INDIAN FORESTER.

75. Ghosh, R.C., Bakhshish Singh and Uma Dutt Dhondiyal (1977) Control of Imperata in Forest Plantations through application of chemical Weedicies; INDIAN FORESTER.

76. Mathur, R.B. and Bakhshish Singh (1973) Results of trial of Eucalyptus species at Lalkua in Uttar Pradesh, India. Forestry Conference. Dehra Dun, Dec ; 1973

77. Mathur, R. B, and Bakhshish Singh (1973) Effect of different types of planting stock, nursery and planting techniques, on the growth and survival of Eucalyptus hybrid (Mysore Gum). Forestry Conference, Dehra Dun, December, 1973.

78. Verma, B; Bakhshish Singh and Patel, A.P. (1973) Study of Mortality of Eucalyptus plantations in Mahi Ravines, Central Gujarat. Annals of Arid Zone, Jodhpur, 12(1&2) :9-18; March-June, 1973.

79. Ghosh, R.C., Bakhshish Singh and Sharma K.K. (1980) Stage of pricking of Pine Seedlings for raising planting stock. *Indian Forester*; 106(5): 319-326

80. Ghosh, R.C., Bakhshish Singh, Dhoundiyal, U.D and Sharma K.K. (1982) Performance of different provenances of Chir pine in comparison to *Pinus caribaea*, *P. Patula* and *P. kesiya* in the Sub-Himalayan zone. *Indian Forester*; 108 (1): 29-38.

81 Bakhshish Singh (1984) Selection and improvement of Poplars in the Sub-Himalayan region of the U.P. State. NATIONAL SEMINAR ON POPLARS, Haldwani (India), 21st to 23rd April, 84

82. Bakhshish Singh, R K Dubey and K.S. Roopwal (1984) Results of some phenological studies on exotic Poplars; NATIONAL SEMINAR ON POPLARS, Haldwani (India), 21st to 23rd April, 1984.

IV. ENERGY CONSERVATION, BIOMASS PRODUCTION, HARVESTING, NUTRIENT CYCLING, MANAGEMENT AND UTILISATION ETC.

83. Bakhshish Singh (1974) Fuelwood Plantations to meet the Energy Crisis in India. CONVENTION ON NATIONAL ENERGY, New Delhi, 13-16 Sept; 1974.

84. Bakhshish Singh (1975) Fuelwood Plantations to meet the Energy Crisis. OIL COMMENTARY Jr; March, pp.1-5.

85. Bakhshish Singh (1975) Role of Forestry in mitigating the Energy Crisis in India. INDIAN FORESTER, 101 (10): 589-596.

86. Bakhshish Singh (1967) Logging in Kulu Forests. 11TH SILVICULTURAL CONFERENCE, Forest Research Instt: Dehra Dun.

87. Bakhshish Singh (1970) Comparative Economics of old and new Methods of Logging in the Western Himalayas. INDIAN FOREST COLLEGES MAGAZINE.

88. Bakhshish Singh and Manmohan Singh (1977) Afforestation for Paper & Pulp Industry in India-mixed v/s pure plantations. SEMINAR ON AFFORESTATION, EXPLOITATION AND PRESERVATION OF FOREST RAW MATERIALS, 27-28 August, 1977, Indian Pulp and Paper Technical Association, Forest Research Instt; Dehra Dun.

89. Bakhshish Singh and Mathur, R.B.(1973) Seasonal behaviour of height and diameter increment of Eucalyptus hybrid (Mysore Gum) in Northern India. FORESTRY CONFERENCE , Dehra Dun, December, 1973.

*90. Bakhshish Singh, Verma, B; and Monappa,K.(1967) A study on growth performance and volume production of some Eucalyptus species for Fuel Reserves in the Ravine Lands-I. VAN VIGYAN (Jr. SOCIETY OF INDIAN FORESTERS); Vol.5, No.3 and 4, Sept.-Dec; 1967, pp.85-94.

*91. Bakhshish Singh, Verma, B. and Monappa, K.(1969) A study on the growth performance of some Eucalyptus species for Development of Fuel Reserves in Ravine Lands-II. VAN VIGYAN (Jr.Soc. of Indian Foresters) 7(1 & 2) : 12-18: March-June,1969.

92. Bakhshish Singh (1989) A Study of Silvicultural Practices, Biomass Production and Nutrient Cycling (NPK) in Poplar Plantations of Sub-Himalayan tract of U.P. State, India. THESIS FOR DEGREE OF DOCTOR OF PHILOSOPHY IN FORESTRY, Department of Forestry, Kumaun University, Nainital, India, pp. 343.

93. R.P. Singh, Bakhshish Singh and B.S.Rana (1990) Estimates of Biomass and Net Production for three Poplar (*Populus deltoides*) clones (I.C., D-121, and G-3) planted in the Central Himalayan Tarai region. SEMINAR ON FOREST PRODUCTIVITY; Dehra dun, India, 23rd to 24th April, 1990.

V. FORESTRY EDUCATION

94 Bakhshish Singh (1966) Recent trends in Forestry in India. Key Paper; SPECIAL REFRESHER COURSE FOR FOREST OFFICERS, Forest Research Institute, Dehra Dun.

95 Bakhshish Singh (1969) Forestry and Silviculture in Australia. An Assessment Report of the Study Tour to Australia from March to June, 1969.

96 Bakhshish Singh (1976) Forestry in Australia. World Forestry Lecture; INDIAN FOREST COLLEGES, Dehra dun.

97. Bakhshish Singh (1986) Forestry Training in Uttar Pradesh State for the staff of Forest Department- its review and perspective for future. A report prepared for the FOREST DEPARTMENT, U.P. STATE, India.

98. Bakhshish Singh (1989) Training of Forestry Personnel in Uttar Pradesh State - its review and perspective for future. SEMINAR ON FORESTRY EDUCATION AND TRAINING IN INDIA; Dehra dun, 30th June to 1st July, 1988; Soc Indian Foresters,pp 36-44.

99. Bakhshish Singh(1988) Environment and Forests: Critical Relationships Report of the Working Group for the COURSE PROGRAMME ON CHANGING NATURE OF FORESTRY-MANAGING THE ENVIRONMENT; held at the Academy of Administration, Nainital (India), 12th-17th Sept.1988.

VI. WATERSHED MANAGEMENT, ENVIRONMENTAL CONSERVATION, RESOURCES SURVEY AND LANDUSE PLANNING; FORMULATION OF MANAGEMENT PLANS, SCHEMES AND PROJECTS ETC.

100. Bakhshish Singh (1957) Forest influences on Environment. FOREST RANGERS COLLEGE MAGAZINE, Dehra Dun, pp. 28-34.

101. Bakhshish Singh (1968) A contribution to the Flora of Gujarat Ravines at Vasad; Communicated to the INDIAN FORESTER.

*102. Bakhshish Singh (1971) Ravines Problem in India, their causes, cure and Reclamation. THESIS, INDIAN FOREST COLLEGES, Dehra dun, pp. 154.

103. Bakhshish Singh (1973) Working Scheme for the Soil Conservation -cum- Rehabilitation Project at Paturi in the Tehri dam Catchment. U.P. FOREST DEPARTMENT.

104. Dalal, S.S; Wasi Ullah, and Bakhshish Singh (1961) Fires in relation to Watershed Management. TENTH SILVICULTURAL CONFERENCE, Forest Research Institute & Colleges, Dehra dun

105. Mathur, H.N; Ram Babu, Joshie, P. and Bakhshish Singh (1976) Effect of clear -felling and re-afforestation on Runoff and Peak Rates in small Watersheds. INDIAN FORESTER; 102 (4) :219-226

*106. Bakhshish Singh (1988) Environment and Forests : Critical Relationships. Report of the Working Group for the COURSE PROGRAMME ON CHANGING NATURE OF FORESTRY - MANAGING THE ENVIRONMENT ; held at the Academy of Administration, Nainital (India) from 12th to 17th September, 1988.

107. Bakhshish Singh (1988) Preliminary Working Plan Report for the Management of Bijnor Plantation Forest Division for the period 1990-91 to 1999-2000, Working Plans circle, U.P. FOREST DEPTT; Nainital (India).

108. Bakhshish Singh(1989) Preliminary Working Plan Report for Kalagarh Forest Division for the period 1990-91 to 1999-2000. Working Plans Circle, U.P. FOREST DEPTT ; Nainital, India.

109. Bakhshish Singh and K.M.Thakur(1989) Working Plan for the Ramnagar Forest Division for the period 1988-89 to 1997-98. Working Plans Circle ,U.P. FOREST DEPARTMENT, Nainital , India.

110 Bakhshish Singh and C B Nath(1989) Working Plan for the North Gonda Forest Division for the period 1988-89 to 1997-98. Working Plans Circle , U.P.FOREST DEPARTMENT,Nainital, India.

111. Bakhshish Singh and C B Nath (1989) Working Plan for the Social Forestry Division Gonda for the period 1988-89 to 1997-98. Working Plans circle, U.P. DEPARTMENT, Nainital, India.

112. Bakhshish Singh and Prem Ram (1989) Integrated Watershed Management Project for the Doon Valley Eco- restoration. Landuse Survey Directorate, U.P. FOREST DEPARTMENT, Dehra dun , India, pp 204

113. Bakhshish Singh, P.Ram and Ranjna Kala (1990) Integrated Watershed Management Project for Benalgad Watershed. Land use Survey Directorate,U.P. FOREST DEPARTMENT , Dehra dun, India May 1990,pp 123.

114 Bakhshish Singh, and Ranjna Kala (1990) Project for Rehabilitation of Degraded Forests in the Himalayan region of U P. State. Land use Survey Directorate, U.P.FOREST DEPARTMENT, Dehra dun,India, March 1990, pp 74.

115 Bakhshish Singh and A.C. Gupta (1990) Integrated Watershed Management Project for Bhagirathi-Bhilangana (Tehri Dam Catchment). Land use Survey Directorate, U.P. FOREST DEPTT; Dehra Dun, August 1990,pp.85.

116. Bakhshish Singh (1990) Eco-restoration and Environmental Conservation through Integrated Watershed Management in the Doon Valley of Central Himalayan region (India). Proc. INTERNATIONAL SYMPOSIUM ON WATER EROSION, SEDIMENTATION AND RESOURCES CONSERVATION; 9th to 13th Oct., 1990. Dehra dun

117 Bakhshish Singh (1991) Perspective for Protection and Conservation of Agricultural land in U.P. Hills Chapter for long-term landuse Plan for U.P. Himalayas STATE LANDUSE PLANNING COMMITTEE, Landuse and Conservation Board (Hill Devt.), Lucknow.

118 Bakhshish Singh (1991) Perspective for conservation and Development of Forest Resources in the Himalayan region of U.P. State . Chapter for the Long-term landuse Plan for U.P.Himalayas STATE LANDUSE PLANNING COMMITTEE, Landuse and Conservation Board (Hill Devt Dept), Lucknow, India.

119 Bakhshish Singh and A P Aggarwal (1991) Integrated Watershed Management Project for Jamrani Dam Landuse Survey Directorate, U.P. FOREST DEPTT; Dehra Dun, India. June 1991, pp 93.

120. Bakhshish Singh (1991) Action Plan for Treatment of Eroding Areas in Tehri Dam Catchment. 1992-93 to 1996-97. Landuse Survey Directorate. U.P. FOREST DEPTT; Dehra Dun, India. August 1991, pp. 91.

121. Bakhshish Singh (1991) Afforestation and Soil Conservation in Tehri Dam Catchment. Progress from 1983-84 to 1990-91. Bhagirathi Circle, FOREST DEPARTMENT, U.P; JUNE 1991, pp.124

BIO DATA

PROPOSED POSITION : Forestry Impact Specialist

NAME : Amar Nath Chaturvedi

DATE OF BIRTH : 5th February, 1930

NATIONALITY : Indian

EDUCATION : (1) M.Sc. (Mathematics) 1951
(The years in which various qualifications are obtained must be stated)
(ii) B.Sc 1949

OTHER TRAINING : (i) Certificate of Forestry Management Programme
(ii) Certificate of Forest Resources Appraised in Forestry & Land Use Planning
(iii) Certificate of Electronics data Processing Courses
(iv) Associate of Indian Forestry Colleges (Diploma)

LANGUAGE & DEGREE OF PROFICIENCY : (i) English
(ii) Hindi

MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Member of the Man and Biosphere Committee of the Department of Environment, Govt. of India
(ii) Member of the Senior Scientist Panel of the INDO-US Programme on Biomass of the Department of Science & Technology, Govt. of India.
(iii) Guest Faculty Member of College of Agriculture Banking, Reserve Bank of India, Pune.
(iv) Guest Faculty Member of Indian Institute of Forest Management, Bhopal.
(v) Guest Faculty Member of Kumaon University, Department of Forest

- (vii) Member of the Research Advisory Committee of the National Botanical Research Institute, Lucknow
- (viii) Member of the Advisory Committee on Technical Schemes of National Bank for Agriculture and Rural Development (NABARD).
- (ix) Member of Editorial Committee of International Society of Tropical Forests, Maryland (U.S.A).
- (x) Member of Society of Indian Foresters.
- (xi) Member of Bio-Energy Society of India.
- (xii) Member of Species survival Commission of ICUN - 1985-1987, 1987-1990, 1990-1993

COUNTRIES OF WORK EXPERIENCE	:	India
		Royal Government of Bhutan
EMPLOYMENT RECORD	:	(starting with present position. List in reserved order <u>(every employment held)</u>)
(i) FROM 7/86	:	TO This date
EMPLOYER	:	Tata Energy Research Institute
POSITION HELD AND DESCRIPTION OF DUTIES	:	Senior Fellow
ii) From 8/1980	:	To 6/1986
EMPLOYER	:	U.P. Government
POSITION HELD	:	Conservator of Forests & Additional Chief Conservator of Forests
iii) From 10/79	:	To 8/80
EMPLOYER	:	U.P. Government
POSITION HELD	:	Conservator of Forests, Training and Director.

iv) From 7/79	To 9/79
EMPLOYER	: U.P. Government
POSITION HELD	: Project Director
(v) From 3/76	: To 7/79
EMPLOYER	: Royal Govt. of Bhutan (Deputation)
POSITION HELD	: Deputy Director of forests
(vi) From 5/73	: To 3/74
EMPLOYER	: U.P. Government
POSITION HELD	: Divisional Forest Officer
(vii) From 9/67	: To 2/73
EMPLOYER	: U.P. Government
POSITION HELD	: Mensuration Officer
(viii) From 9/64	: To 9/67
EMPLOYER	: U.P. Government
POSITION HELD	: Divisional Forest Officer
(ix) From 9/61	: To 9/64
EMPLOYER	: U.P. Government
POSITION HELD	: Divisional Forest Officer
(x) From 4/55	: To 9/61
EMPLOYER	: U.P. Government
POSITION HELD	: Asstt. Conservator of Forests in various Forest Divisions in Hills and Plains
DETAILED TASKS ASSIGNED	:
(List of tasks one by one and support each task by project experience on the right hand side)	<ul style="list-style-type: none"> · (List project name, location, year, position held, i.e. Team Leader, Hydrologist, Agricultural Economist, etc. exact duties rendered and time spent on each project)

RTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : John C. B.
DATE OF SIGNING : - / /
DAY MONTH YEAR

1. PROPOSED POSITION : **Forestry Specialist**
 2. NAME : **O.N. KAUL**
 3. DATE OF BIRTH : **July 27, 1930**
 4. NATIONALITY : **Indian**
 5. EDUCATION :
 M.F. (Master of Forestry) Yale University, School of Forestry and Environmental Studies, USA. 1952
 B.Sc. East Punjab University. 1948
 F.Sc. (Faculty of Science) Punjab University, Lahore, Pakistan. 1946
 Matriculation Punjab University, Lahore, Pakistan. 1944

6. OTHER TRAINING :

Name of Institution/ University	Period	Degree/Diploma/Specialised Course
Jamnalal Bazaz Institute of Management Studies, Bombay.	26.5.87 to 30.5.87	Attended Training Course on Organisational Behaviour and Management.

(Deputed by Govt. of India)

J & K Institute of Management and Public Administration, Srinagar.	25.6.86 to 1.7.86	Attended Training Course on Indian Administration.
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(Deputed by Govt. of India)

F.A.O./S.I.D.A., New Delhi.	27.11.78 to 16.12.78	Attended FAO/SIDA Seminar Course on Forest Resources Appraisal in Forestry and Land-Use Planning.
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(As FAO Fellow-
Deputed by Govt. of India)

Banaras Hindu University, Varanasi. 17.6.70 to 20.6.70 Attended Advanced Seminar Course in Plant Productivity with Special Reference to Grassland Biome.

(Deputed by Govt. of India)

U.N.E.S.C.O., Kathmandu, Nepal. 5.4.68 to 18.4.68 Attended UNESCO Advanced Seminar Course on Ecology of Tropical Highlands.

(As UNESCO Fellow-
Deputed by Govt. of India)

Forestry Institutes, Experiment Stations and Universities in U.S.A., Puerto Rico, U.K, Sweden, Germany, Switzerland and Italy. 21.3.65 to 8.8.65 Specialised Training and Study tour in Forestry and Forest Ecology (Silvics and Silviculture), Tropical Forestry, Forest Tree Physiology, Forest Genetics and Tree Improvement, Forest Productivity, Soil and Water Conservation (including Watershed and Range Management), Afforestation, Torrent and Avalanche Control, Aerial Photogrammetry etc.

School of Forestry and Environmental Studies, Duke University, USA 6.9.64 to 20.3.65 Certificate in Advanced Silviculture.

(As FAO Fellow-
Deputed by Govt. of India)

Central Arid Zone Research Institute, Jodhpur. 23.10.60 to 30.10.60 Attended Training Course on Grassland Management.

(Deputed by Govt. of India)

Forest Research Institute & Colleges, Dehra Dun. 1.9.53 to 10.10.53 Attended Training Course on Silviculture and Statistics.

(Deputed by Govt. of India)

7. LANGUAGE & DEGREE OF PROFICIENCY

Language	Read	Write	Speak	Understand
Kashmiri (Mother tongue)	Excellent	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent	Excellent
Urdu	Excellent	Excellent	Excellent	Excellent
Hindi	Good	Fair	Excellent	Excellent
Nepalese	-	-	Slight	Fair
Persian	-	-	Slight	Slight
Punjabi	-	-	Fair	Excellent
Bengali	-	-	Fair	Fair
Arabic	-	-	-	Fair

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES :

I am a Life Member of the Society of Indian Foresters and have been its past General Secretary, Vice-President and a Member of the Executive Committee. I have also been the Editor of the Society's journal VAN VIGYAN for several years.

I was Honorary Editor of the monthly journal INDIAN FORESTER during 1982-83 and have been a Member of the journal's Board of Management and Local Management Committee.

I have been a Member/associated with about 20 Subject Groups/Project Groups/Working Parties of International Union of Forestry Research Organisations (IUFRO).

I have been a Member/Convenor of a large number of High Level Committees/Expert Groups/Task Forces etc of the Govt. of India, Indian Council of Agricultural Research, National Commission on Agriculture, Science Advisory Committee to the Cabinet, Supreme Court of India, Planning Commission, various State Governments, other Organisations like Indian Council of World Affairs, School of Planning and Architecture, etc with regard to forestry research and development, environmental impacts assessment, protection and conservation and energy conservation. I have also done a number of assignments in this regard and produced some national documents, including the latest one for the World Bank for an integrated Forestry Development project in Maharashtra.

9. COUNTRIES OF WORK

EXPERIENCE : India, Nepal, U.S.A.

10. EMPLOYMENT RECORD :

(1) FROM 16.10.89 TO date

EMPLOYER : Tata Energy Research Institute, New Delhi

POSITION HELD AND

DESCRIPTION OF DUTIES : Senior Fellow, Tata Energy Research Institute, New Delhi: Global Warming; environmental impacts, protection and conservation; joint forest management programmes with involvement of local population; forestry research and development; energy conservation.

(2) FROM 10.12.87 TO 31.1.89

EMPLOYER : Govt. of Mizoram, Aizawl.

POSITION HELD AND

DESCRIPTION OF DUTIES : Principal Chief Conservator of Forests and Secretary, Environment and Forest Department, Govt. of Mizoram, Aizawl: Head of the Environment and Forest Department in Mizoram State and Secretary to the State Government for the same Department; management of forests and wildlife in the State; environmental protection and conservation; control of shifting cultivation, soil and water conservation in river catchments, degraded forests and hilly regions; pollution control; raising of large scale plantations; forestry research and training; working plans; social and community forestry; energy forestry; rural/tribal development; consolidation of forests; resource inventories; forestry extension; coordination, planning and development; overall direction, control and administration of the Department.

(3) FROM 1.5.86 TO 9.12.87

EMPLOYER : Govt. of Mizoram, Aizawl.

POSITION HELD AND

DESCRIPTION OF DUTIES : Chief Conservator of Forests and Secretary, Environment and Forest Department, Govt. of Mizoram, Aizawl: Same as (2) above.

(4) FROM 26.9.84 TO 19.1.86

EMPLOYER : Govt. of Goa, Daman and Diu, Panaji.

POSITION HELD AND

DESCRIPTION OF DUTIES : Conservator of Forests and Additional Secretary, Forest Department, Govt. of Goa, Daman and Diu, Panaji: Head of the Forest Department in the State and Additional Secretary to the State Government for the same Department as well as Chief Wildlife Warden; management of forests and wildlife in the State; environmental protection and conservation; raising of large scale plantations; soil and water conservation in river catchments, degraded forests and hilly regions; forestry research, training and extension; working plans; social and community forestry; energy forestry; rural development; resource inventories, consolidation of forests; coordination, planning and development; overall direction, control and administration of the Department.

(5) FROM 18.7.83 TO 16.4.84

EMPLOYER : Forest Research Institute and Colleges, Govt. of India, Dehra Dun.

POSITION HELD AND

DESCRIPTION OF DUTIES : Coordinator (Research, Coordination and Extension), Forest Research Institute and Colleges, Govt. of India, Dehra Dun: Planning, coordination and development of forestry research programmes at the Institute and of the State Forest Departments; funding of forestry research and development programmes through universities and other agencies; monitoring of research and development programmes and budgetary control; aid programmes of International agencies and foreign Governments; research administration and finance.

(6) FROM 20.5.78 TO 17.7.83

EMPLOYER : Forest Research Institute and Colleges, Govt. of India, Dehra Dun.

POSITION HELD AND

DESCRIPTION OF DUTIES : Conservator of Forests, Forest Productivity (Forest Ecology), and officer-in-charge, Forest Ecology Branch, Forest Research Institute and Colleges, Govt. of India, Dehra Dun: In charge of Forest Ecology Branch; plan, guide, conduct, control, direct and coordinate forest ecological and environmental research in various forest ecosystems of India; forest productivity research - potential productivity of Indian forests, Organic productivity and cycling of minerals and

materials in forest ecosystems; utilisation of solar energy by forest crops and energy forestry research; teaching Forest Ecology and allied subjects to students/scholars; administration of Forest Ecology Branch.

During my above assignment I was in additional charge of the following positions at the Institute.

Coordinator (Research Coordination), Forest Research Institute and Colleges from 23.4.81 to 25.7.81 which involved research coordination, planning, development and research administration and finance at the Institute.

Registrar, Forest Research Institute and Colleges from 15.6.81 to 10.9.81 and 13.1.82 to 17.3.82, which involved administration of the whole Institute of about 3,000 employees.

Director of Forestry Research, Forest Research Institute and Colleges from 19.10.81 to 30.11.81 and 16.6.82 to 17.6.83 which involved forestry research and administration of the Directorate of Forestry Research.

(7) FROM 25.2.78 TO 17.5.78

EMPLOYER : Govt. of Arunachal Pradesh, Itanagar.

POSITION HELD AND

DESCRIPTION OF DUTIES : Chief Wildlife Warden (Conservator of Forests), Forest Department, Govt. of Arunachal Pradesh, Tirap: Head of Wildlife Organisation in Arunachal Pradesh; incharge of Wildlife Circle with five Wildlife Divisions in the State; management and development of wildlife; Administration of wildlife organisation.

(8) FROM 24.2.75 TO 20.2.78

EMPLOYER : Forest Research Institute and Colleges, Govt. of India, Dehra Dun.

POSITION HELD AND

DESCRIPTION OF DUTIES : Conservator of Forests (Forest Ecologist) and officer-in-charge, Silvics Branch, Forest Research Institute and Colleges, Govt. of India, Dehra Dun: In charge of Silvics Branch (Forest Ecology, Forest Physiology and Forest Influences); To plan, guide, conduct, control, direct and coordinate forest ecological and environmental research in various forest ecosystems of India; teaching Forest Ecology and allied subjects to Forestry students, officer trainees of short term courses and other scholars; coordination of research work in Forest Ecology, Forest Physiology and Forest Influences and organising short courses in these disciplines; administration of Silvics Branch.

(9) FROM 1.2.73 TO 23.2.75

EMPLOYER : Forest Research Institute and Colleges, Govt. of India, Dehra Dun.

POSITION HELD AND

DESCRIPTION OF DUTIES : Ecologist and officer-in-charge, Silvics Branch, Forest Research Institute and Colleges, Govt. of India, Dehra Dun: Same as (8) above.

(10) FROM 4.10.61 TO 31.1.73

EMPLOYER : Forest Research Institute and Colleges, Govt. of India, Dehra Dun.

POSITION HELD AND

DESCRIPTION OF DUTIES : Ecologist, Forest Research Institute and Colleges, Govt. of India, Dehra Dun: In charge of Ecology Section; To plan, guide, conduct, control, direct and coordinate forest ecological and environmental research in various forest ecosystems of India; teaching Forest Ecology and allied subjects to Forestry students, officer trainees of short term courses and other scholars; administration of Ecology Section.

(11) FROM 22.6.59 TO 30.9.61

EMPLOYER : Govt. of India, Ministry of Agriculture, New Delhi.

POSITION HELD AND

DESCRIPTION OF DUTIES : Assistant Soil Conservation Officer (Forest), Soil Conservation Research, Demonstration and Training Centre, Govt. of India, Kota: In charge of Forestry Section; silvicultural research; afforestation and soil and water conservation in ravine areas and semi-arid regions; demonstration of correct forestry and soil and water conservation practices in these regions; teaching soil and water conservation forestry to officer trainee; administration of Forestry Section.

(12) FROM 6.1.58 TO 10.6.59

EMPLOYER : Govt. of India, Ministry of Agriculture, New Delhi.

POSITION HELD AND

DESCRIPTION OF DUTIES : Assistant Soil Conservation Officer (Forest), Soil Conservation Research, Demonstration and Training Centre, Govt. of India, Chatra, Nepal: In charge of Forestry Section; silvicultural research; afforestation and soil and water conservation in degraded watersheds, river catchments and hilly regions; torrent control; training and demonstration in forestry and soil and water conservation in river catchments; administration of Forestry Section.

(13) FROM 15.5.57 TO 27.12.57

EMPLOYER : Govt. of Himachal Pradesh, Shimla.

POSITION HELD AND

DESCRIPTION OF DUTIES : Assistant Conservator of Forests, Forest Department, Govt. of Himachal Pradesh, Chamba: Management of forests; divisional charge; working plans; forest settlement; afforestation and soil and water conservation in hilly areas and river catchments; administration.

(14) FROM 24.10.56 TO 9.5.57

EMPLOYER : Govt. of India, Ministry of Agriculture, New Delhi.

POSITION HELD AND

DESCRIPTION OF DUTIES : Senior Technical Assistant, Ministry of Agriculture, Govt. of India, New Delhi: Planning, development and coordination of soil and water conservation projects; scrutiny of projects for funding; writing of technical reports.

(15) FROM 9.3.53 TO 27.1.56

EMPLOYER : Govt. of India, Ministry of Agriculture, New Delhi.

POSITION HELD AND

DESCRIPTION OF DUTIES : Junior Research Officer, Desert Afforestation Research Station, Govt. of India, Jodhpur: Arid zone silvicultural research; afforestation and soil conservation in arid, semi-arid and desert areas; species introduction and trials; roadside plantations; grassland management; administration of various afforestation centres under my charge.

(16) FROM 16.6.51 TO 31.8.52

EMPLOYER : Yale University, School of Forestry and Environmental Studies, New Haven, USA.

POSITION HELD AND

DESCRIPTION OF DUTIES : Research Assistant, Yale University, School of Forestry and Environmental Studies, New Haven, USA: Timber testing of Tropical American Woods under a project awarded by the U.S. Navy to the School.

11. DETAILED TASKS ASSIGNED :

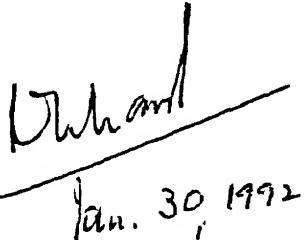
Prior to my joining the Tata Energy Research Institute, New Delhi, as a Senior Fellow where I am primarily working on various forestry and environmental issues, forestry and environmental research and development and energy-environment interface, I was a member of the Indian Forest Service with nearly 36 years of experience in different assignments in forestry research and development; environmental impacts, protection and conservation; afforestation; forest management, soil and water conservation, energy forestry and administration. Further, my association /assignments with various High Level Committees (where I have produced some national documents) in this regard have given me additional qualifications and experience to deal with such tasks as assigned to me in this project.

12. CERTIFICATION

: I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE :

DATE OF SIGNING :


Jan. 30, 1992

BIODATA

PROPOSED POSITION : Forestry Impact Specialist

NAME : Vijay Kumar Koul

DATE OF BIRTH : 11 July, 1959

NATIONALITY : Indian

EDUCATION : (i) M.Sc (Forestry UHF, Solan (H.P.) 1989
(ii) B.Sc. (Agriculture) GNDU (Punjab) 1981

OTHER TRAINING : .

LANGUAGE & DEGREE OF PROFICIENCY : (i) English: Read, write and speak fluently
(ii) Hindi: Read, write and speak fluently
(iii) Kashmuri: Speak fluently

MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Indian Society of Tree Scientist
(ii) Bio-energy Society of India
(iii) Ladakh Ecological Dev. Group
(iv) Associate Nitrogen Fixing Tree Association.

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD :
i) From: April 1991 To: present
Employer: Tata Energy Research Institute
Last held: Research Associate
Description of duties: Research activities.
ii) From: April 1990 To: March 1991
Employer: S.K. University of Agricultural Science & Technology
Last held: Jr. Scientist/Asstt. Professor
Description of duties: Research activities.
iii) From: September 1982 To: April 1990
Employer: S.K. University of Agricultural Science & Technology
Last held: Research Assistant
Description of duties: Research activities.
iv) From: January 1982 To: September 1982
Employer: J&K Government
Last held: Agriculture Extension Officer
Description of duties: Extension activities.

FILED TASKS ASSIGNED :

<u>Project Name</u>	<u>Location</u>	<u>Year</u>	<u>Position held</u>	<u>List of tasks</u>
	Akhmoor, Jammu (J & K)	1982	Agri. Extension Officer	Demonstration & extension of latest farming technologies
	R.S.Pura, Jammu (J & K)	1982- 1986	Research Asstt.	Introduction, selection & hybridization of high yielding disease resistant varieties of wheat & Rice under irrigated & rainfed zone of Jammu
	R.S.Pura, Jammu (J & K)	Jan 89- April 90	Research Asstt.	Role of allelopathy in trees species vs. agriculture crops Agroforestry for Kandi areas
	Leh, Ladakh (J & K)	April 90- March 91	Jr. Scientist/ Asstt. Prof.	Introduction & identification of tree species for fuel fodder under cold arid zone. Improved selection of existing tree species under cold arid zone.
Establishment Biomass Research Centre	New Delhi	April 91- till date	Research Associate	Raising of trials for finding out suitable plant species & provenances for biomass production in degraded site of trans-gangetic plains. To develop methods of vegetative propagation of different fuel wood species & compare them with seedling growth. To develop package & practices for fuel wood species.

CERTIFICATION :

I, the undersigned certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : Vijay Anand.
DATE OF SIGNING : 29 / 01 / 1992
DAY MONTH YEAR

BIODATA

1. PROPOSED POSITION	Energy Technologist																
2. NAME	: Vallentyne Vinod Niranjan Kishore																
3. DATE OF BIRTH	: 12th August 1948																
4. NATIONALITY	: Indian																
5. EDUCATION	:																
<table border="1"> <thead> <tr> <th>Degree</th> <th>Year</th> <th>Institute</th> </tr> </thead> <tbody> <tr> <td>Ph.D. (Chem. Engg)</td> <td>1972</td> <td>Indian Institute of Technology, Kanpur</td> </tr> <tr> <td>M.Tech. (Chem. Engg)</td> <td>1973</td> <td>Indian Institute of Technology, Kanpur</td> </tr> <tr> <td>B.Tech. (Chem. Engg)</td> <td>1970</td> <td>Andhra University,</td> </tr> <tr> <td>H.S.S.L.C.</td> <td>1965</td> <td>Board of Secondary Education, Andhra Pradesh</td> </tr> </tbody> </table>			Degree	Year	Institute	Ph.D. (Chem. Engg)	1972	Indian Institute of Technology, Kanpur	M.Tech. (Chem. Engg)	1973	Indian Institute of Technology, Kanpur	B.Tech. (Chem. Engg)	1970	Andhra University,	H.S.S.L.C.	1965	Board of Secondary Education, Andhra Pradesh
Degree	Year	Institute															
Ph.D. (Chem. Engg)	1972	Indian Institute of Technology, Kanpur															
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B.Tech. (Chem. Engg)	1970	Andhra University,															
H.S.S.L.C.	1965	Board of Secondary Education, Andhra Pradesh															
6. OTHER TRAINING	:																
7. LANGUAGE & DEGREE OF PROFICIENCY	English - fluent written & spoken : Hindi - fluent written & spoken																
8. MEMBERSHIP OF PROFESSIONAL SOCIETIES	:																
1. Currently holding the position of Secretary, Solar Energy Society of India, which is the Indian Section of International Solar Energy Society (ISES).																	
2. Acted as faculty in several energy related training courses sponsored by the Government of India, UN - ESCAP and APDC.																	
3. Member, ISES.																	
4. Associate Member, American Solar Energy Society.																	

5. Member, Bureau of Indian Standards, for the sub-committee on Solar Energy Devices (1987-90).
6. Served on a Committee of experts constituted by the DNES for revising the subsidy structure for biogas plants (1987).
7. Served on a Committee of experts constituted by the Government of Tamil Nadu to evaluate a feasibility study for a coal based power generation cum desalination plant for Madras (1984).
8. Visited Switzerland, China, Philippines, Pakistan, Bangladesh, Vietnam, Mexico, Maldives, Lao PDR and USA in connection with projects/training courses.
9. Acted as a member of the sub-committee on biomass gasification for preparing the eighth 5-year plan document of the Department of Non-Conventional Energy Sources, Ministry of Energy, New Delhi (1989).
10. Acted as a reviewer for journals such as Solar Energy, Journal of Solar Energy Engineering (ASME), SESI Journal etc.
11. Acted as an expert for evaluating proposals submitted to the Government of India in biomass gasification and solar thermal utilization.
12. Member of the International Advisory Committee for planning of the ISES Solar World Congress held at Denver, Colorado, 1991.
13. Acted as external examiner for M. Tech. and Ph. D. theses submitted at the Indian Institute of Technology, New Delhi and Bhavnagar University, Bhavnagar.

9. COUNTRIES OF WORK EXPERIENCE : India, Switzerland, China, Philippines, Pakistan, Bangladesh, Vietnam, Mexico, Maldives, Lao PDR and USA

10. EMPLOYMENT RECORD :

Period	Position held	Institute
1990-	Sr. Fellow and Dean, Energy Engg. New Delhi & Technology	Tata Energy Research Institute, New Delhi
1984-1990	Fellow	Tata Energy Research Institute, New Delhi
1980-1984	Scientist 'C'	Central Salt & Marine Chemicals Research Institute, Bhavnagar

1978-1980	Research Engineer	Indian Institute of Technology, Kanpur
1973-1978	Senior Research Fellow	Indian Institute of Technology, Kanpur
1971-1973	Junior Research Fellow	Indian Institute of Technology, Kanpur

11. DETAILED TASKS ASSIGNED :

1984- : Tata Energy Research Institute, New Delhi

Current Major Projects

The Renewable Energy Technology area in TERI consists of about 18 professionals and covers almost all technologies such as photovoltaics, wind energy, solar thermal, biomass, etc. I am responsible for generating proposals and executing projects in the areas of solar thermal, biomass gasification, biogas, etc. Some of the projects for which I am either the principal investigator, or one of the main investigators are listed below:

1. 6000 m² Solar Pond Project

Sponsored by : Department of Non-Conventional Energy Sources,
Ministry of Energy

Collaborators : Gujarat Energy Development Agency &
Gujarat Dairy Development Corporation

Objectives : Development of indigenous solar pond technology
for applications such as process heat,
desalination, drying and power generation

Funding Level : Rs.62,00,000/- (\$ 2,50,000, @ Rs.25/- per US\$)

Status : A 6000 m² solar pond constructed at Kutch Diary,
Bhuj to supply 1,00,000 lit./day of hot water for
the dairy.
Ongoing.

Role : Project Leader

2. Development of a Solar Double Chimney System for Comfort Conditioning

Sponsored by : Department of Non-Conventional Energy Sources,
Ministry of Energy

Objectives : To develop a solar passive system coupled to an
evaporative cooling system to provide thermal

comfort throughout the year for buildings located in composite climatic zones.

Funding Level : ~Rs.7,00,000 (\$30,000)

Status : Ongoing

Role : Project Leader

3. Briquetting/Gasification System for Small Scale Power Generation

Sponsored by : Department of Non-Conventional Energy Sources, Ministry of Energy, 1986-90
Internal funding since August 1990

Objectives : Develop prototypes for utilising many kinds of biomass (in briquetted form) for decentralized power generation

Funding Level : Rs.7,00,000 (\$30,000)

Status : Two prototypes with nominal capacities of 3.7 kW and 7.0 kW designed, fabricated and tested. The 7.0 kW prototype currently under long term field testing in a village. Residues like saw dust, groundnut shell, mustard stalk, etc. have been tested in the system successfully.

Role : Project Leader

4. Development of Fixed Dome Biogas Plants

Sponsored by : Internal

Objectives : To develop optimally designed biogas plants for rural application

Status : 4 different models designed, constituted and tested under field conditions. Performance data for 2 years obtained for 4 plants. Residence time distribution studies and thermal analysis carried out. On going.

Role : Project Leader

5. Study of Techno-economic viability of Mobile Units for Repair and Maintenance of Biogas Plants

Sponsored by : Council for Advancement of People's Action & Rural Technology, New Delhi

Funding Level : Rs.2,48,000 (\$10,000)

Status : Survey and study of two regions completed.
Ongoing

Role : Co-investigator

6. Evaluation of Coal Briquettes and Special Smokeless Fuels (SSF) as Domestic Fuels

Sponsored by : Coal India Ltd., Calcutta

Objectives : Determine status of coal briquetting and SSF industry, examine techno-economic mix, suggest improvements, conduct laboratory tests of the fuels in different stoves and carry out enduse comparison with other fuels such as kerosene and LPG.

Funding Level : ~Rs.10,00,000/- (\$40,000)

Status : Survey of various coal briquetting and SSF units in the country going on.

Role : Co-investigator

Completed Projects

7. Development of energy-efficient driers for some cash crops (Project funded by the Department of Science & Technology, New Delhi).
8. Promoting large-scale manufacture and commercialization of decentralized energy systems in India (Project funded by the Commission of the European Communities [CEC] and carried out in collaboration with IT Power Ltd, UK)
9. Development of a 15-year perspective plan for utilization of RES in Rajasthan (Project funded by the Rajasthan Energy Development Agency)
10. Evaluation of potential for renewable energy utilization in Andaman, Nicobar and Lakshadweep Islands (Project funded by the Department of Non-Conventional Energy Sources)
11. Development of a low-cost, shallow solar pond domestic hot water system (Internal project)
12. Establishment of a test-rig for flat plate collector testing (Internal project)
13. Studies on Paraffin Wax as a Thermal Storage System for Low Temperature Applications (Internal project)

14. Studies on Natural Cooling Potential for Buildings (Internal project)

1980-1984: Central Salt and Marine Chemicals Research Institute, Bhavnagar

15. Development of a Solar (thermal) Water Pump for Lift Irrigation

This was a collaborative venture between the Indian and Swiss Governments and executed mainly at CSMCRI, Bhavnagar. I was acting as the project leader for Indian team consisting of 8 engineers.

16. Studies on a 1600 m² Solar Pond (Internally funded project)

1978-1980: Indian Institute of Technology, Kanpur

17. Development of a Natural Water Cooler

This was a project funded by the Tata Energy Research Institute. The outcome of the project was the development of a water chilling unit based on evaporative and nocturnal radiative cooling.

CERTIFICATION

: I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : *Miphore*
DATE OF SIGNING : 3rd Feb, 1992
DAY MONTH YEAR

BIODATA

1. PROPOSED POSITION : Energy Technologist

2. NAME : Veena Joshi

3. DATE OF BIRTH : 05 July, 1954

4. NATIONALITY : Indian

5. EDUCATION : (i) Ph.D (Physics) Indian Inst. of Technology, Kanpur 1982
(ii) M.Sc. (Physics) Indian Inst. of Technology Bombay 1974
(iii) B.Sc. (Hons.) (Physics) University of Karnataka Dharwar 1972

6. OTHER TRAINING .

7. LANGUAGE & DEGREE OF PROFICIENCY : English: read, write, speak fluently

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : (i) Solar Energy Society of India
(ii) Computer Society of India
(iii) Indian Association for Environmental Management

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :
1985 to date: Fellow, Tata Energy Research Institute, New Delhi.
1984 to 1985: Senior Research Associate, Tata Energy Research Institute, Field Research Unit, Pondicherry.
1982 to 1983: Post Doctoral Fellow, Central Salt & Marine Chemicals Research Institute, Bhavnagar.
1981 to 1982: Senior Research Fellow, Central Salt & Marine Chemicals Research Institute, Bhavnagar.

11. DETAILED TASKS ASSIGNED : Related work experience

12. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : 

DATE OF SIGNING : 3 / 2 /1992
DAY MONTH YEAR

BIODATA

1. PROPOSED POSITION : Energy Technologist

2. NAME : K.B. Pande

3. DATE OF BIRTH : 26th October, 1949

4. NATIONALITY : Indian

5. EDUCATION : M. Tech. (Mechanical Engg.) 1974
from Indian Institute of Technology,
Bombay (India)

6. OTHER TRAINING : B.A. (English Literature)

7. LANGUAGE & DEGREE OF
OF PROFICIENCY : English, Hindi, Marathi (speak, read
& write)

8. MEMBERSHIP OF PROFESSIONAL (i) Associate Member
SOCIETIES : British Hydraulic Research
Association, U.K.

(ii) Member
Association of Energy Engineers,
Atlanta, U.S.A.

(iii) Indian Society of Heat & Mass
Transfer

9. COUNTRIES OF WORK
EXPERIENCE : India

10. EMPLOYMENT RECORD : Please see attached sheet

11. DETAILED TASKS ASSIGNED : Energy Technologist

12. CERTIFICATION : I, the undersigned, certify that, to
the best of my knowledge and belief,
this biodata correctly describes
myself, my qualifications and my
experience. I understand that any
willful misstatement described herein
may lead to my disqualification or
dismissal, if employed.

SIGNATURE : 
DATE OF SIGNING: 8 / 1 / 92
Day Month Year

Professional Experience

1. 1971 : As Technical Management Trainee in Hindustan Aeronautics Limited (HAL)

2. August 1974 - June 1977: As Asstt. Engineer in Tata Consulting Engineers (TCE), Bangalore.

* Design of Heat Transfer Equipment such as Fuel Oil Suction Heaters, Bearing Water Coolers and other auxiliary heat exchangers. Specifications for these equipment, their tender analysis, evaluation and making a purchase recommendation.

* Preparation of Feasibility Reports for Compressed Air System, Fuel Oil Handling System, Potable Water System and Coal Handling System related to Thermal Power Plants.

* Preparation of General Arrangement, and Piping Layout drawings for steam and water systems. Flexibility analysis. Coordination with Civil, Structural and Electrical Depts. Project Engineering, Progress Evaluation, Manpower Expenditure and interaction with Customers.

3. July 1977 - March 1988: As Engineer/Senior Engineer/ Dy Manager & Manager in Bharat Heavy Electricals Ltd. (BHEL)

** July 1977 - May 1978: In the Energy Systems & New Products (ESNP) Division of BHEL at New Delhi.

* Computer-aided Thermal Simulation of a Pebble-bed Regenerative Air Preheater, required in the 5 MW experimental MHD Power Plant. The Code predicts performance of the Air Preheater. Based on the results, suitable design modifications were incorporated in the design. Also, its control was studied effectively.

* Was deputed to The Institute of High Temperature/ Moscow in connection with the Inter-Governmental MHD Programme - particularly related to the Air Pre-heater.

** May 1978 - July 1985: In the Corporate R&D Division of BHEL at Hyderabad.

* Estimation of thermal performance of Desuperheating, Condensing and Sub-cooling type of Feed Water Heaters with a view to improve their performance and make them competitive. Thermal Calculation of Economiser. Close interaction with the manufacturing plants with regard to these heaters.

- * Project In-Charge for another DRDO-sponsored Project related to the thermo-mechanical analysis of a Convergent-divergent shaped Thrust Chamber of a Rocket Engine. The Chamber was of double-wall construction, with corrugated passages sandwiched between the walls for flow of coolant. A Computer Program was developed for its transient as well as steady state analysis. Based on the analysis, valuable modifications were incorporated to yield trouble-free performance of the Chamber.
- * Thermal engineering assistance (in terms of design and analysis of different equipment) to other groups and departments.
- * Field Engineering Services

** August 1985 - March 1988: As Manager in the Advanced Research Projects (ARP) Group of BHEL at New Delhi.

- * Head of Heat Transfer Engineering Department
- * Numerical Heat Transfer & Fluid Flow as applied to various systems/equipment
- * 3-dimensional Transient Thermo-mechanical analysis of bodies like nozzles and other similar fixtures
- * Conceptual Design and sizing of a special type of 2-Phase flow Heat Exchanger producing superheated steam. Planning and designing the Test Facility for experimental investigation of this Exchanger.
- * Assisting the General Manager of R&D Division and Executive Director of ARP Group in matters like Project Planning, Budget, Project Review Systems; and handling his Technical Secretariat.
- * Writing detailed Project Proposals and Technical Part of Contracts for Projects related to thermo-mechanical engineering.
- * Chairman of Project Review & Consultation Teams for various R&D Projects.

4. April 1988 - May 1990: As Engineering Manager, In-charge of Thermal Engineering Department (Senior Manager grade): in Engineering R&D Wing of MECON, a Public Sector Organization

- * Design and Analysis of the Pebble-bed Thermal Storage equipment used in the Solar Heating System.
- * Design and Performance Analysis of various Shell-and-Tube Heat Exchangers using detailed iterative flow-stream analysis methods (which take into account the effect of all the leakage and bypass streams). The outcome of such computer-aided analysis provides a vital input for studying flow-induced vibration of tube-bundles - a potential failure hazard during part-load operation.
- * Project Leader for Development of Computer Code for detailed 3-dimensional Thermal-hydraulic analysis of Recirculating U-tube Nuclear Steam Generators using Numerical methods. It predicts the three components of shell-side velocity as well as temperature field. This provides important inputs for calculating thermal stresses, and helps prevent the possible hot spots, flow-induced vibration and material degradation.

This Code, with suitable changes, can also be used for studying detailed performance of various other heat exchangers. As a result, the expensive and time-consuming route of model testing can be avoided.

Such Computer Codes are available abroad. But they are either proprietary or prohibitively costly. Indigenous development of such a Code has saved considerable foreign exchange.

- * Design/analysis of Plate-fin Compact Heat Exchangers for cooling hot oil/exhaust gases by cold air. Development of technology related to the fabrication of corrugated fins and aluminium brazing, required for such exchangers.
- * Project Manager for a DRDO-sponsored Project (worth Rs. 50 lakhs) involving design, development, fabrication and testing of a Cooling System. The Cooling System mainly consisted of a Plate Cooler with grooved channels through which the cooling oil flows; a Plate-fin type Compact Heat Exchanger; a motor-operated positive displacement pump. Apart from selection and procurement of materials and the design/manufacture of the above components, test-rigs were designed and erected for testing individual components as well as the integrated system. Further, they were subjected to various stringent qualification tests set by the Customer. Writing a detailed Project Proposal and its negotiation with the Customer was also a major activity.

- * Computer-aided 3-dimensional transient analysis of Cowper Stoves. By using results of such analysis, several operating parameters were studied without requiring costly experimentation. Further, it helped to decide upon the most favourable operating conditions. Problems like repeated falling off of chequerwork and refractory were identified and remedied through design alterations based on such analysis.
- * Computation of time-dependent 3-dimensional temperature distribution in composite walls of various high temperature furnaces. Detailed thermal analysis of the inter-connected processes starting from pouring of metal to heating inside the Soaking pit, in order to come up with optimised operating parameters, and heat input profiles in the Soaking pit, so that the subsequent rolling is proper.
- * Study of furnace cooling systems and blast humidification system.
- * Design/analysis, optimization and fabrication of Thermoelectric Devices including the heat dissipating systems, for achieving direct conversion of heat to electrical power, and vice versa. In certain applications like defence, aerospace, medical, remote-locations, where reliability and maintenance-free long operation is required, thermoelectric devices serve as excellent alternative. Further, in view of ozone depletion due to the use of CFCs in conventional refrigerators, TE systems are assuming more importance for certain cooling applications.
- * Design/analysis of High-Temperature Regenerators as well as Metallic and Ceramic Tubular Recuperators used for preheating air, to recover the waste heat. Waste Heat Recovery.
- * Project Planning, Monitoring and Failure Analysis Services

5. May 1990 - Todate: Tata Energy Research Institute (TERI), New Delhi

- * Energy Audits pertaining to the Industrial Sector with a view to achieve energy conservation.
- * Techno-economic evaluation of different energy conservation techniques.
- * Heat Pipe Heat Exchangers
- * Flash Steam & Condensate Recovery System - its feasibility and design.
- * Planning of Hardware/Experimental Facilities. Implementation of related projects

- * Development of Ozone-safe, energy-efficient Refrigerators
- * Use of Compressed Natural Gas (CNG) in transport sector. Conversion of road vehicles to the use of CNG.
- * Computer-aided design and analysis of thermo mechanical systems using finite difference techniques. Transient analysis of heat transfer equipment.

Papers Presented and Publications

- 1) 'Module Method for performance estimation of Shell-and-Tube Heat Exchangers' at the 3rd National Heat & Mass Transfer Conference at Bombay in 1975.
- 2) 'Thermal Simulation of a Regenerative Air Preheater' at the 5th National Heat & Mass Transfer Conference at Hyderabad in 1980.
- 3) BHEL Internal Report: 3-D Thermal-hydraulic Analysis of Steam Generators
- 4) BHEL Internal Report: Heat Transfer Analysis of a Thrust Chamber
- 5) BHEL Internal Report: Design & Development of a Cooling System
- 6) BHEL Short Study : Temperature Fields in a Feedwater Nozzle

Lectures Delivered

- 1) 'Design of a Fuel Oil Suction Heater: A Case Study'. At I.I.Sc. Bangalore in connection with the Quality Improvement Programme for College Teachers.
- 2) 'A Preview of Various Heat Exchangers used in Thermal Power Plants'. At the Graduate Engineers' Training Programme in BHEL/Delhi (1981).
- 3) 'Modelling of Thermal Systems'. At Central Mechanical Engineering Research Institute (CMERI)/Durgapur and Tata Energy Research Institute (TERI)/Delhi (1989).
- 4) 'Thermoelectric Systems: Optimum Design' At CMERI/Durgapur.
- 5) 'Design and Performance Prediction of Thermoelectric Systems' at Defence Electronics Research Lab (DLRL)/Hyderabad.

Advanced Study Institute

Participated in the Advanced Study Institute (ASI) on "Design/Development of various Heat Exchangers" conducted by Tata R&D Centre and National Chemical Laboratory at Pune in July 1986. Participants/Staff included many reputed Heat Transfer Specialists from USA, UK and other countries.

Committees

Member of the Haryana State Level Working Group on Energy Conservation.

Member of the Divisional Scientific Committee on Design & Analysis of the Central Mechanical Engg Research Institute (CMERI)/Durgapur, set up to review their research programmes.

Member of the PARC for development on an air-borne liquid-cooling system at Centre for Air Borne Systems (CABS), Bangalore.

Close interaction with various Educational Institutions and National Laboratories.

Examiner for the engineering post-graduate courses.

1. PROPOSED POSITION : Energy Technologist

2. NAME : AJAY MATHUR

3. DATE OF BIRTH : August 30, 1958

4. NATIONALITY : Indian

5. EDUCATION
(the years in which various qualifications are obtained must be stated) : Ph.D. (Energy Engineering and Policy), University of Illinois 1985.
M.S. (Energy Engineering) University of Illinois 1981.
B.Eng.(Chemical Engineering) University of Roorkee, 1979.

6. OTHER TRAINING :

7. LANGUAGE & DEGREE OF PROFICIENCY : English - fluent written & spoken,
Hindi - fluent written & spoken .

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : Institution of Engineers (India),
International Association for Energy Economics, American Institute of Chemical Engineers.

9. COUNTRIES OF WORK EXPERIENCE : INDIA, USA

10. EMPLOYMENT RECORD :

TATA ENERGY RESEARCH INSTITUTE, NEW DELHI.
Fellow, 1989- present.
Research Associate, 1986-88.
Working in the areas of Energy-Environment interaction, Fuel Cell development, and modeling and analysis of Coal Utilization; Global Warming

TATA ENERGY AND RESOURCES INSTITUTE, WASHINGTON, DC
Vice President, 1991-1992
Worked towards the establishment of the Institute; development of workplans; and linkages with organizations and institutions involved in energy and environmental issues in developing countries.

Department of Chemical Engineering, University of Illinois at Chicago, Chicago
Visiting Assistant Professor, 1985-86.
Taught courses on Process Control, Heat Transfer, and Mass

Transfer to senior and sophomore level chemical engineering students.

Research Assistant, 1981-85.

Conducted experimental investigations on hydrodynamics and heat transfer in Gas fluidized beds; supervised operation and maintenance of Fluidization Research Laboratory; and coordinated work of four research students in the Lab.

Teaching Assistant, 1979-81.

Assisted in undergraduate courses on fluid mechanics and thermodynamics; supervised lab sessions, graded homework and exams.

11. DETAILS OF SOME TASKS UNDERTAKEN

a. Energy Options for South India

1986-87 : Energy Technologist
Assessed technological alternatives for power generation in South India and carried out techno-economic analysis of various investment options.

b. Coal Pricing in India

1987 : Energy Policy Analyst
Analysed coal production costs, Assessed and evaluated pricing structures, and recommended a rationalised pricing system for coal.

c. Evaluation of coking coal supplies in India

1988 : Energy Technologist
Assessed and evaluated coking coal reserves and production in India vis-a-vis estimated quantity and making; recommended optimum coal-blends and production plan.

d. Key Issues in Power Sector Development

1989-90 : Energy Policy Analyst
Identified key issues constraining the development and efficient operation of the power sector in India, and analyzed policy options to overcome the constraints.

e. Development of an integrated Biogas - phosphoric Acid Fuel Cell System for Onsite Power Generation

1986-91

: Energy Technologist

Worked towards the design, fabrication, installation and commissioning of a 2 kw PAFC stack fuelled by hydrogen produced through the reformation of biogas.

f. Technological Options for Limiting GHG Emissions from the Power Sectors in India

1991-92

: Energy Technologist and Policy Analyst

Examined various technological options available for reducing GHG Emissions due to power generation in India in the perspective of their applicability, technical effectiveness, and economic efficiency.

g. Commercialization of CFC-free, Energy Efficient refrigerators in India

1991-92

: Energy and Environmental Analyst

Launched an initiative to commercialize CFC-free, energy-efficient refrigerators in India alongwith Indian manufacturers of refrigerators, compressors, and refrigerants.

12. CERTIFICATION

: I, the undersigned certify that, to the best of my Knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE :

DATE OF SIGNING : 2 - 0 - '99
Day Month Year

BIODATA

PROPOSED POSITION : Energy Technologist

NAME : Damyant Luthra

DATE OF BIRTH : 27th December, 1957

NATIONALITY : Indian

EDUCATION : 1) Ph.D. Industrial Engg., University of Windsor, Canada, 1988.
2) M.Tech., Systems and Control Engg., Indian Institute of Technology, Bombay, India, 1981.
3) B.E., Electrical Engg., University of Nagpur, India, 1979.

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English, Hindi (read, write and speak fluently).

MEMBERSHIP OF PROFESSIONAL SOCIETIES : Member of Committee for Evaluating the Environmental Implications of Energy Policy in the 8th Plan for the state of Maharashtra, India.

COUNTRIES OF WORK EXPERIENCE : Canada, India

EMPLOYMENT RECORD :

(i) FROM April 1989 : TO This date
EMPLOYER : Tata Energy Research Institute

POSITION HELD & DESCRIPTION OF DUTIES : Consultant

(ii) FROM May 1988 : TO December 1988
EMPLOYER : GERAD, University of Montreal and Montreal and McGill University research group.

POSITION HELD & DESCRIPTION OF DUTIES : "Professional de recherche"

(iii) FROM Sept. 1981 : TO December 1988
EMPLOYER : University of Windsor, Canada

POSITION HELD & DESCRIPTION OF DUTIES : Teaching and Research Assistant

DETAILED TASKS ASSIGNED : Energy Technologist

Related Work Experience

- Developed a techno-economic energy planning model for the province of Ontario, Canada (Ph.D. thesis) that included the supply, conversion, transportation and end-use sectors. This included scenario development and analysis. The model was translated in the MARKAL framework for inter-connection with MARKAL-QUEBEC for the Energy Mines and Resources, Canada.
- Developed a process model for the Iron and Steel Industry for Ontario, Canada.
- Developed a systems model to study the policy options for India for the use of alcohol as a fuel for the transportation sector.
- Deputy Team Leader for the project sponsored by Asian Development Bank on Environmental Considerations in Energy Development - India country study.
- Principal Investigator of a project for emission inventory of NO_x for the city of Bombay and dispersion modelling for NO_x from the Tata Electric Company Power Plant in Bombay.
- Currently coordinating and working on a project for Risk Benefit Analysis of large-scale methods of generating electricity. Includes the quantification and costing of environmental impacts from thermal, nuclear and hydro power generation

CERTIFICATION

: I, the undersigned, certify that, to the best of my knowledge and belief, this bio-data correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

Danyane Sultan

DATE OF SIGNING:

5 / 2 / 92
Day Month Year

1. PROPOSED POSITION : Energy Technologist

2. NAME : Chandra Shekhar Sinha

3. DATE OF BIRTH : 28-08-1961

4. NATIONALITY : Indian

5. EDUCATION :

Ph.D.	Energy Studies	Indian Institute of Technology, New Delhi	1990
M.Tech.	Energy Studies	Indian Institute of Technology, New Delhi	1986
M.Sc.	Physics	Indian Institute of Technology, Kanpur	1985
B.Sc.	Physics	Patna University	1983

6. OTHER TRAINING :

7. LANGUAGE & DEGREE OF PROFICIENCY : English - read, write and speak fluently.
Hindi - read, write and speak fluently.

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : Solar Energy Society of India

9. COUNTRIES OF WORK
EXPERIENCE : India

10. EMPLOYMENT RECORD :

From December 1989 to date
Working as Research Associate at Tata Energy Research Institute, New Delhi in the areas of rural energy.

From September 1987 to November 1989
Worked as Visiting Research Associate at Tata Energy Research Institute, New Delhi in the areas of renewable energy and rural energy.

From January 1987 to December 1989
Worked as Senior Research Fellow at Indian Institute of Technology, New Delhi at the Center for Energy Studies working in the area of renewable energy.

From July 1985 to December 1986
Worked as Junior Research Fellow at Centre for Energy Studies, Indian Institute of Technology, Delhi, at the Center for Energy Studies working in the area of renewable energy.

11. DETAILED TASK ASSIGNED**: RELATED WORK EXPERIENCE**

1. A fifteen year perspective plan for renewable energy utilisation in Rajasthan, study funded by the Rajasthan Energy Development Agency (R.E.D.A.), Govt. of Rajasthan, Jaipur, India.
2. Study of decentralised energy options for the rural sector of India, study funded by the Rural Electrification Corporation and the Department of Non-conventional Energy Sources, Government of India.
3. Promoting Large Scale Manufacture and Commercialisation of Decentralised Energy Systems in India, funded by the Commission of the European Communities, Brussels, IT Power Ltd., England in association with Tata Energy Research Institute and IDS Ltd., New Delhi.
4. Energy survey and the preparation of block energy plan for Gopi Kandar, district Dumka, study funded by Government of Bihar, Patna.
5. Developing a methodology for rural energy planning at the district level: study funded by the Department of Non-conventional Energy Sources (DNES), Government of India, New Delhi.
7. Potential role of renewables in the electricity sector, study funded by the Commission of the European Communities, Brussels.

8. Renewable Energy Programmes
in Brazil, China, India,
Philippines and Thailand,
study funded by The World
Bank, Washington D.C.,
U.S.A.

CERTIFICATION

: I, the undersigned, certify that,
to the best of my knowledge and
belief, this biodata correctly
describes myself, my qualifications
and my experience, I understand that
any willful misstatement described
herein may lead to my
disqualification or dismissal,
if employed.

SIGNATURE : *Mawardi Singh*

DATE OF SIGNING: 27 / 01 / 1992
Day Month Year

BIO - DATA

PROPOSED POSITION : **Energy Technologist**

NAME : **KANISHKA N. DASSANI**

DATE OF BIRTH : **21 November, 1966**

NATIONALITY : **Indian**

EDUCATION : **(i) MBE, University of Delhi 1989
(ii) BA (Hons) (Economics), University of Delhi 1987**

OTHER TRAINING : **--**

LANGUAGE AND DEGREE OF PROFICIENCY : **(i) English
(ii) Hindi**

MEMBERSHIP OF PROFESSIONAL SOCIETIES : **-**

COUNTRIES OF WORK EXPERIENCE : **India**

EMPLOYMENT RECORD :

FROM **7/89** : TO **Present**

EMPLOYER : **Tata Energy Research Institute**

POSITION HELD : **Research Associate**

TASK ASSIGNED : **RELATED WORK EXPERIENCE**

Energy Technologist : **Have compiled a Database on Renewable Energy Technologies and Energy Conservation**

CERTIFICATION : **I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describe myself, my qualifications and my experience. I understand that any wilful mis-statement described herein may lead to my disqualification or dismissal, if employed.**

SIGNATURE : **K.N.Dassani**

DATE OF SIGNING : **29 / 01 / 1992**
DAY MONTH YEAR

BIODATA

PROPOSED POSITION : Energy Technologist

NAME : G. Chandrashekhar

DATE OF BIRTH : 01 August, 1968

NATIONALITY : Indian

EDUCATION : (1) B.Sc. (Elec. Engg.) 1989
Jamia Millia Islamia, New Delhi

OTHER TRAINING :

LANGUAGE & DEGREE OF PROFICIENCY : English. Read, write and speak fluently.

MEMBERSHIP OF PROFESSIONAL SOCIETIES :

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD :
From 9'89 To: present
Working as Research Associate at Tata Energy Research Institute, New Delhi on projects mainly in the power sector.

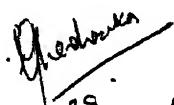
DETAILED TASKS ASSIGNED : Related work experience

Database on existing and likely additions of coal-fired thermal power stations. 1. Worked on a study on "Electricity System Development in India, submitted to CEC, Brussels, Jan'91

Prepare background papers for national workshop and training programmes 2.1 Worked on Load Management in HT industries by time shifting of certain loads, submitted to Power Finance Corporation, India.

2.2 Asian utilities databook, compilation of Indian Utility Statistics

CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : 

DATE OF SIGNING : 29.1.92
DAY MONTH YEAR

BIODATA

PROPOSED POSITION : Resource Economist

NAME : Leena Srivastava

DATE OF BIRTH : 7 September, 1960

NATIONALITY : Indian

EDUCATION : (i) Registered for a Ph.D
Indian Institute of Science,
Bangalore
Likely to submit by Mid-March 1992
(ii) M.A. (Econ.) 1982
University of Hyderabad
(iii) B.A. (Econ. & Mathematics) 1980
Ostronia University, Hyderabad

OTHER TRAINING : Attended the Energy Management Training Program at the Brookhaven National Lab., Upton, New York, September-November, 1983.

LANGUAGE & DEGREE OF PROFICIENCY : English: Read, write and speak fluently.
Hindi: Read, write and speak fluently.

MEMBERSHIP OF PROFESSIONAL SOCIETIES : Pacific and Asian Journal of Energy

COUNTRIES OF WORK EXPERIENCE : India

EMPLOYMENT RECORD :
From: 1989 To: present
Employer: Tata Energy Research Institute, New Delhi

Post held: Fellow
From 1983 To: 1988
Employer: Tata Energy Research Institute, New Delhi

Post held: Research Associate

1. DETAILED TASKS ASSIGNED : Resource Economist

2. CERTIFICATION : I, the undersigned, verify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement contained herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : Leena Srivastava

DATE OF SIGNING : 28 / 1 / 92
DAY MONTH YEAR

BIO-DATA

1. Name : Leena Srivastava
2. Date of Birth : 7th September, 1960
3. Address : E-48, Greater Kailash II,
New Delhi - 110048.
Tel. 6449151
4. Educational Qualifications :
 1. Registered for a Ph.D at the Indian Institute of Science, Bangalore, India (Expect to submit thesis by end-1991).
 2. Attended the Energy Management Training Program at the Brookhaven National Lab., Upton, New York, September-November, 1983.
 3. M.A.(Economics), 1st Div., University of Hyderabad, Hyderabad, 1980-81 to 1981-82.
 4. B.A.(Economics & Mathematics), 1st Div., Osmania University, Hyderabad, 1977-78 to 1979-80
5. Work Experience :
 - 1989 to date - Fellow, Tata Energy Research Institute, New Delhi.
 - 1983 - 1988 - Research Associate, Tata Energy Research Institute, New Delhi.
6. Professional Experience :
 - Projects worked on :
 1. Resource Allocation for Energy in India.
 2. Development of a Quantitative Model for Systems Evaluation of Energy Related Technologies.
 3. Projecting Demand for Energy and Evaluation of Supply Prospects in India.
 4. The Use of Energy Balances: Conceptual Issues and Compilation Methodology.
 5. Energy Flows in the Indian Economy 1981-82 - An overview.
 6. Food Energy Nexus in India.
 7. Natural Gas Potential in India.
 8. Evaluation and Categorization of Potential Natural Gas Utilization Options.
 9. Urban Household Energy Consumption Analysis.
 10. Agricultural Energy Consumption in India.
 11. Developing An Integrated Energy Plan for the State of Gujarat.
 12. Estimation of Sectoral Contribution to System Load Curve - Case Studies.
 13. Integrated Energy Pricing in India - A Methodological Framework.
 14. Industrial Process Models for Selected Industries.

7. List of Publications:

Papers

1. Pachauri, R.K. and L.Srivastava, "The Changing Structure of Oil Industry in India", The Energy Journal, Vol.II, Nos.4/5.
2. Pachauri, R.K., Chia Yon-chen and L. Srivastava,"Coal Transportation System Modelling - The Case of Taiwan: A Comment", The Energy Journal, Vol.6, No.3, 1985.
3. Srivastava L. and R.K. Pachauri, "Microcomputers in India : Use of TEESE, The TERI Energy Economy Simulation and Evaluation Model, Microcomputer Applications for Energy Planning in Developing Countries, United Nations, 1986.
4. Srivastava L. and R.K. Pachauri, "The Effects of Price and Non-price Policies on Demand Management", Structural Change and Energy Policy, UNESCAP, May, 1987.
5. Srivastava L., "The Role of Energy Models in Planning in India", Proceedings of the Regional Energy Workshop, Kathmandu, TERI, New Delhi, 1986.
6. Pachauri, R.K. and L. Srivastava, "India's Energy Policy Response to the Oil Price Increase of 1973-74", Energy Policy Issues, Thukral, K. (ed.), Allied Publishers Pvt. Ltd., New Delhi, 1985.
7. Srivastava L., "The TERI Rural Energy Economy Model", Proceedings of the Workshop on Common Accounting Procedures for Assessing Biomass Resources in Developing Countries, April, 1986.
8. Srivastava, L. and Ranjan K.Bose, "Agricultural Energy Requirements in India", Proceedings of the 10th Annual International Conference of the IAEE, July 1988.
9. Pachauri, R.K. and L. Srivastava, "Integrated Energy Planning in India : A Modelling Approach", The Energy Journal, Vol. 9, No. 4, October, 1988.
10. Suri, V. and L. Srivastava, "Delinking Energy and Economic Growth in India", International Conference on "India's Energy Consumption in the Year 2000 - Towards Delinking Economic Growth and Energy", November 9 - 10, 1989, New Delhi
11. Srivastava, L. and Mala Damodaran, "Uncertainties in the Middle East - Impact on the Indian Economy", Strategic Analysis, Vol.KIII, No. 7, 1990.
12. L. Srivastava and S. Gupta, "Getting off this 'Fuelish' Path", Tata Energy Research Institute, 1990.

Books

1. Pachauri, R.K. and L. Srivastava (ed.), "Energy Policy Issues", Tata Energy Research Institute, 1987.
2. Pachauri, R.K. and L. Srivastava (ed.), "Energy Policy Issues", Vol. 4 (1988), Tata Energy Research Institute, 1989.
3. Pachauri, R.K., L. Srivastava and K. Thukral (ed.), "Energy Environment and Development", 1991, Vikas Publishing House Pvt Ltd, New Delhi.
4. Pachauri, R.K., and L. Srivastava (ed.), "Role of Innovative Technologies and Approaches in India's Power Sector", 1991, Tata McGraw-Hill Publishing Company Limited, New Delhi.

8. Conferences/Training Programmes co-ordinated and organised :

1. One week refresher course on Energy Planning and Demand Management for IAS Officers', October, 1987, India. (30 participants)

2. Training Programme on Energy planning for less developed countries (sponsored by ESCAP) (20-25 participants)
 - * Kathmandu, Nepal, June 16 - 27, 1986
 - * Dhaka, Bangladesh November 9 - 20, 1986
 - * Male, Maldives, May 29 - June 2, 1988
 - * Vientiane, Lao PDR, April 10-14, 1989
 - * Thimphu, Bhutan, November 2 - 7, 1989
 - * Yangon, Myanmar, April 7-13, 1991
3. Training Programme on Energy Planning for South Asian Countries (30-30 participants)
 - Goa, October 3-8, 1988
 - Goa, September 16-21, 1989
 - New Delhi, September 10-15, 1990
4. Workshop on Energy Policy Issues, Jaipur, - October, 1985. - December, 1988. (25-30 participants)
5. 12th Annual International Conference of the International Association for Energy Economics, New Delhi, January 4 - 6, 1990 (300 participants)
6. Role of Innovative Technologies and Approaches for India's Power Sector, New Delhi, April 24-26, 1990 (200 participants).
9. Workshops/Conferences/Symposia attended :
 1. Workshop on Microcomputer Applications for Energy Planning in Developing Countries, organised by UNDTCD, September 9 - 13, 1985, New York.
 2. SAARC Workshop on Energy Modelling, February 28, 1986, New Delhi.
 3. Technical Workshop on Biomass Resources Assessment, Commonwealth Science Council, London, April 14 - 18, 1986, London.
 4. Regional Energy Workshop, International Association of Energy Economics, May 26 - 28, 1986 Kathmandu, Nepal.
 5. National Workshop on Energy Auditing, August 4 - 6, 1986, New Delhi.
 6. ICDM 2nd International Workshop on Energy Assessment & Modelling, October 26 - 31, 1987, Pune.
 7. 10th Annual International conference of the International Association for Energy Economics, July 4 - 7, 1988, Luxenberg.
 8. Workshop on Energy and Environment for Inputs into the National Conservation Strategy, August 4 - 5, 1989, New Delhi.
 9. International Symposium on Energy Systems, Management and Economics, October 25 - 27, 1989, Tokyo.
 10. International Conference on India's Energy Consumption in the Year 2000 - Towards Delinking Economic Growth and Energy, November 9 - 10, 1989, New Delhi.
 11. IPCC'EIS Workshop on Greenhouse Gas Emissions, June 11-13, 1990, London.
 12. International Workshop on Natural Resource Accounting, March 5-6, 1991, Vancouver, Canada.
10. Others: (i) Member of the Energy Panel of the National Alliance of Young Entrepreneurs (1989).
(ii) Member of the International Association for Energy Economics.
(iii) Treasurer, Indian Association for Energy and Environmental Economics.
(iv) Associate Editor, Pacific and Asian Journal of Energy.
(v) Member, TERI Advisory board.

BIODATA FORMAT TO BE SUBMITTED WITH PROPOSAL

1. PROPOSED POSITION : Resource Economist

2. NAME : Meeta Mehra

3. DATE OF BIRTH : 26th November 1965

4. NATIONALITY : Indian

5. EDUCATION : Degree University Year
(The years in which various qualifications are obtained must be stated)
- Masters in University of Delhi Business Economics
- B.A.(Hons) University 1986 Economics

6. OTHER TRAINING : Attended "Post Graduate Advanced Course on Energy Engineering" organised by the Italian Ministry of Foreign Affairs in Rome from June-Dec. 1989:

7. LANGUAGE & DEGREE OF PROFICIENCY : Hindi - Fluent in reading, writing and speaking English - Fluent in reading, writing and speaking

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : None

9. COUNTRIES OF WORK EXPERIENCE : None overseas

10. EMPLOYMENT RECORD : (Starting with present position. List in reversed order every employment held)
FROM - June 1988 : TO - January 1992
EMPLOYER : Tata Energy Research Institute
POSITION HELD AND DESCRIPTION OF DUTIES : Research Associate

11. DETAILED TASKS ASSIGNED : WORK UNDERTAKEN WHICH BEST ILLUSTRATES CAPABILITY TO HANDLE THE TASKS ASSIGNED
(List project name, location, year, position held, i.e. Team Leader, Hydrologist, Agricultural Economist, etc. exact duties rendered and time spent on each project)
(List of tasks one by one and support each task by project experience on the right hand side)

<u>Project Name</u>	<u>Location</u>	<u>Year</u>	<u>Position held</u>	<u>Project Details</u>
1. TERI's Research on Energy & National Development (TREND)	New Delhi	1988-89	Economist	Forecasting of Energy Demand & supply for the year 2010 for various economic sector and end-uses.
2. Mathematical Models for Demand Forecasting of Coal	New Delhi	1990	Economist	Developed an econometric model for forecasting coal demand for the Indian Steel Industry for 1995, 2000, 2005 & 2010.
3. Co-authored 2 Papers for the "Report on Global Warming & Associated Impacts: Phase I"				
I. Global Warming. An overview of Technology Options	New Delhi	1990	Economist	
II. India's Contribution to Global Anthropogenic Emissions of Greenhouse Gases - 1987-88	New Delhi	1990	Economist	
4. Co-authored a paper entitled "A Reappraisal of WRI's Estimates of Greenhouse Gas Emissions" to be published in the Natural Resources Forum, February 1992.	New Delhi	1991	Economist	
5. Integrated Energy Pricing	New Delhi	1989-91	Economist	Developed an analytical framework to view prices substitute fuels in an integrated fashion. Also estimated economically efficient prices for coal, oil & electricity & compared with the market prices in a common framework.
6. Energy for Tomorrow's World The South Asian Region	New Delhi Nepal, Bhutan, Bangladesh	1991-92	Economist	Energy-economy interactions, energy perspective, environmental considerations in energy development.
7. Environmental Considerations in Energy Development - India country study for the ADB	New Delhi	1991-92	Economist	Estimated the demand for fuels in the urban domestic sector in 2010 taking into account demographic & economic factors.

12. CERTIFICATION

: I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE



DATE OF SIGNING: 28 1 1992
Day Month Year

BIODATA

1. PROPOSED POSITION : Resource Economist

2. NAME : Preety Bhandari

3. DATE OF BIRTH : 01 July, 1965

4. NATIONALITY : Indian

5. EDUCATION : (i) M.A. (Business Economics) 1987
University of Delhi
(ii) B.A. (Hons.) (Economics) 1985

6. OTHER TRAINING : (i) Attended the Energy Training Programme conducted by the Centre for Energy & the Environment, University of Pennsylvania, USA from January 1991 through June 1991.

7. LANGUAGE & DEGREE OF PROFICIENCY : (i) English: Read, write and speak fluently
(ii) Hindi: Read, write and speak fluently

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : Secretary, Asian Energy Institute

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :

(i) From: 6 87 To: present

Working as a Research Associate at Tata Energy Research Institute, New Delhi on several projects in the areas of Energy and Environment.

(ii) From: 6 87 To: 8 86

Worked as a Summer Intern at the Federation of Indian Chamber of Commerce and Industry on a project on effects of high cost economy on exports for India.

11. DETAILED TASKS ASSIGNED : Resource Economist

12. CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

: Preety Bhandari

DATE OF SIGNING

: 28 Jan, 1992
DAY MONTH YEAR

BIODATA

1. PROPOSED POSITION : Resource Economist

2. NAME : Vivek Suri

3. DATE OF BIRTH : 11 October, 1965

4. NATIONALITY : Indian

5. EDUCATION : (i) M.A. (Economics) University of Delhi 1989
(ii) B.A. (Hons.) (Economics) University of Delhi 1987

6. OTHER TRAINING :

7. LANGUAGE & DEGREE OF PROFICIENCY : English: Fluent in speaking & writing.

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES :

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :

(i) From: 6/89 To: 8/90 and From: 8/91 To: present
Employer: Tata Energy Research Institute, New Delhi

Post held: Research Associate

Description of duties. (a) Energy Modelling and Policy Analysis.
(b) Economic Impacts of Global Warming.

(ii) From: 12/90 To: 8/91
Employer: Dept. of Economic Analysis & Policy, Reserve Bank of India

Post held: Research Officer

Description of duties: Analysis of monetary data, to provide inputs for monetary and credit policies.

DETAILED TASKS ASSIGNED

Construction of long term energy scenarios for India and associated greenhouse gas emissions. (1989)
(Economist - 4 months)

Economic impacts of global warming (in the Indian context). (1989-90)
(Economist - 4 months)

Energy for Tomorrow's World - a study of the energy-environment-development interactions in the South Asia Region.
(Economist - 4 months)

Environmental considerations in energy development - a country study for India
(Economist - 1 month)

CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : 
DATE OF SIGNING : 28 / 02 / 92
DAY MONTH YEAR

BIODATA

PROPOSED POSITION : Resource Economist

NAME : Gautam Sethi

DATE OF BIRTH : 15 November, 1964

NATIONALITY : Indian

EDUCATION : (i) M.Phil (Libertarianism, Rights and the Pareto Principle) Jawaharlal Nehru University 1992
(ii) M.A. (Eco) University of Delhi 1989
(iii) B.A. (Eco) University of Delhi 1986

OTHER TRAINING : None

LANGUAGE & DEGREE OF PROFICIENCY : (i) English: Read, write and speak fluently
(ii) Hindi: Read, write and speak fluently
(iii) Punjabi: Speak fluently.

8. MEMBERSHIP OF PROFESSIONAL SOCIETIES : None

9. COUNTRIES OF WORK EXPERIENCE : India

10. EMPLOYMENT RECORD :
(i) From: 12/90 To: present

Employer: Tata Energy Research Institute

Post held: Research Associate

Description of duties: Research on Energy Modelling and Policy Analysis.

11. DETAILED TASKS ASSIGNED :
(1) Natural Resource Accounting (Resource Economist)
- attempted to capture the 'Cost' of natural resources and suitably rectify the national income accounts (1991 ongoing)
(2) Comparative analysis of choosing SKO and LPG for domestic cooking (Economist)
- Computed and compared the prices of SKO and LPG both at producers and consumers end.

- (3) Environmental considerations in energy development (Decision Analyst)
 - Helped conduct a multi-attribute assessment exercise.
- (4) General equilibrium modelling (Economist)
 - Helped develop a prototype CGE model.

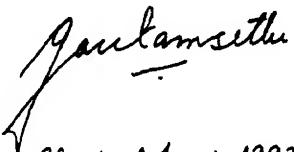
12. CERTIFICATION

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE :

DATE OF SIGNING :

28 / 01 / 1992
DAY MONTH YFAR



BIODATA

2. NAME : HARSHARAN SINGH DATTA

3. DATE OF BIRTH : 27th September, 1965

4. NATIONALITY : Indian

5. EDUCATION :

- (1) SECONDARY SCHOOL OF CERTIFICATE EXAMINATION
(Delhi Board) - First Div. 1980
- (2) SENIOR SCHOOL CERTIFICATE EXAMINATION
(Delhi Board) - First Div. 1982
- (3) B.Sc. (Agri.) Hons.
(Punjab Agri.University) - First Div. 1985
- (4) M.Sc. (Agri. Econ.) Hons.
(Punjab Agri.University) - First Div. 1988

6. OTHER TRAINING : NIL

7. LANGUAGE + DEGREE OF PROFICIENCY :

- (1) English (Read, write, speak fluently)
- (2) Hindi (Read, write, speak fluently)
- (3) Punjabi (Read, write, speak fluently)

8. MEMBERSHIP OF PROFESSIONAL SOCIETY :

Indian Society of Agricultural Economics

9. COUNTRIES OF EXPERIENCE : India

10. EMPLOYMENT RECORD :

- (1) From : January 1992 : To Date
Employer : Tata Energy Research Institute, New Delhi
Position Held + Description of Duties :
RESEARCH ASSOCIATE
- (2) From : March 1990 : April 1991
Employer : Institute of Economic Growth, Delhi
Position Held + Description of Duties :
RESEARCH ASSOCIATE
- (3) From : May 1988 : July 1989
Employer : National Council of Applied Economic Research,
New Delhi
Position Held + Description of Duties :
RESEARCH ASSOCIATE\ECONOMIC INVESTIGATOR

DETAILED TASKS ASSIGNED : The following work was carried out as team work rather than individual assignment

1. Development of cost of Irrigation and subsidies
 1. The main objective of the study was to estimate the expenditure incurred over the period of time, irrigation development cost per unit of area, trend in development costs, capacity utilization, time lag between expenditure incurred and potential created, operational and maintenance expenses and irrigation subsidy.
2. Impact of Irrigation on Multiple Cropping
 2. The relationship between irrigation development and intensity of cropping was estimated at all India level. The regression analysis was carried out for a period of 35 years for 14 states. The thesis of decline in all India impact of irrigation on intensity of cropping was also tested. Exercises were also carried out to assess the comparative impact by type of irrigation.
3. Comparative performance of irrigated vs. unirrigated agriculture
 3. A comparison of performance for irrigated and unirrigated agriculture was carried out for Punjab, Haryana, Madhya Pradesh, Tamil Nadu, Andhra Pradesh, Gujarat, Rajasthan & Bihar. Yield analysis was carried out to examine relative performance for the period 1970-71 to 1988-89.
4. Baseline Study of Operational Flood Areas
 4. The job profile included training of field interviewers, checking of their work, and general logistics of the study. A linear programming model was set up to analyse the relative profitability of dairy enterprises vs. crop enterprises. The enterprise budget data for different crops and dairy was used to examine the relative profitability which was subsequently replaced by the field data collected for 'Baseline Study of Operation Flood Area'.

5. Study of Fertilizer Consumption and Quality Seed

5. The job profile included the training of field interviewers, checking their work, general logistics of the survey, and other related works assigned from time to time.

CERTIFICATION :

I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : Harsharan Singh Datta

DATE OF SIGNING :

13 - January - 1992
Day / Month / year

BIODATA

• PROPOSED POSITION : Resource Economist

• NAME : Neha Khanna

• DATE OF BIRTH : 10 March, 1969

• NATIONALITY : Indian

• EDUCATION : (i) M.A. (Economics) University of Delhi 1991
(ii) B.A. (Hons.) (Economics) University of Delhi 1989

• OTHER TRAINING :

• LANGUAGE & DEGREE OF PROFICIENCY : (i) English: Read, write and speak fluentl
(ii) Hindi: Read, write and speak fluently

• MEMBERSHIP OF PROFESSIONAL SOCIETIES :

• COUNTRIES OF WORK EXPERIENCE : India

• EMPLOYMENT RECORD :

FROM : 6/91 TO : present

Employer: Tata Energy Research Institute, New Delhi

Post held: Research Associate

Description of duties:

- Detailed research on energy modelling and policy analysis and on issues relating to global climate change
- Writing research proposals and technical reports.

11. DETAILED TASKS ASSIGNED :

(1) Collaborative study on Asia's and Brazil's contribution to GHG emissions and policy responses for their minimization (Team Member)

- Estimation of CO₂ emissions in India
- Identification of strategies to limit CO₂ emissions, their potential for adoption in the Indian economy, and costs of these strategies
- Derivation of cost curve based on the above
- Co-ordination with other countries involved in the study
- Writing of research proposal and technical report entitled "Collaborative study on strategies to limit CO₂ emissions in Asia and Brazil".

(2) Environmental Considerations in Energy Development (Team Member)

- Application of multi-attribute utility theory to the environmental impacts of energy development

(3) Preparation of a methodology to undertake national GHG abatement costing studies (Principal Investigator)
- Analysis of concepts of abatement costs in the context of climate change
- Preparation of methodology

(4) CGE Modelling (Team Member)
- Construction of a computable general equilibrium (CGE) model for the Indian economy.

12. CERTIFICATION

: I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE : M. Bhanna
DATE OF SIGNING : 28 / 01 / 1992
DAY MONTH YEAR

BIODATA

Post held: Research Associate

(iv) From: 1/91 To: 9/91
Employer: Dr. R. Jha (Delhi School of Economics)

Post held: Research Assistant

(111) From: 11/90 To 3/91
Employer: Daulat Ram College, University of Delhi

Post held: Lecturer

(iv) From: 1/90 To: 3/90
Employer: Garqi College, University of Delhi

Post held: Lecturer

(v) From: 9/88 To: 7/89
Employer: Daulat Ram College, University of Delhi

Post held: Lecturer

DETAILED TASKS ASSIGNED : Resource Economist

CERTIFICATION : I, the undersigned, certify that, to the best of my knowledge and belief, this biodata correctly describes myself, my qualifications and my experience. I understand that any willful mis-statement described herein may lead to my disqualification or dismissal, if employed.

SIGNATURE

: *Anne Hoy*

DATE OF SIGNING : 28/10/1992
DAY MONTH YEAR

Mr. is the ranking officials for India

Mr. No.	Name	Position	Months															Field	Rate	Non-months
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15			
1 P. Ghosh	Resource Economist	+++++*****																0.45	0.45	
2 L.M. Karonta	Resource Economist	+++++*****																0.45	0.45	
3 L. Srivastava	Resource Economist	+++++*****																0.45	0.45	
4 M. Nehru	Resource Economist	+++++*****																0.45	0.45	
5 P. Bhandari	Resource Economist	+++++*****																0.45	0.45	
6 V. Suri	Resource Economist	+++++*****																0.45	0.45	
7 G. Sethi	Resource Economist	+++++*****																0.45	0.45	
8 M. Khanna	Resource Economist	+++++*****																0.45	0.45	
9 H.S. Datta	Resource Economist	+++++*****																0.45	0.45	
10 R.R. Nangia	Resource Economist	+++++*****																0.45	0.45	
11 A. Roy	Resource Economist	+++++*****																0.45	0.45	
12 V.P. Ahrol	Impact Specialist	+++++*****																0.28	0.28	
13 V. Jagannathan	Impact Specialist	+++++*****																0.28	0.28	
14 S.K. Sinha	Impact Specialist	+++++*****																0.28	0.28	
15 P.V. Dhadral	Impact Specialist	+++++*****																0.28	0.28	
16 R.S. Varshney	Impact Specialist	+++++*****																0.28	0.28	
17 H. Singh	Impact Specialist	+++++*****																0.28	0.28	
18 B. Singh	Impact Specialist	+++++*****																0.28	0.28	
19 A.N. Chaturvedi	Impact Specialist	+++++*****																0.28	0.28	
20 S.P. Banerjee	Impact Specialist	+++++*****																0.28	0.28	
21 S.N. Divedi	Impact Specialist	+++++*****																0.28	0.28	
22 V. Asthana	Impact Specialist	+++++*****																0.28	0.28	
23 O.N. Kaul	Impact Specialist	+++++*****																0.28	0.28	
24 V. Kati	Impact Specialist	+++++*****																0.28	0.28	
25 V. Patterline	Impact Specialist	+++++*****																0.28	0.28	
26 A.N. Achanta	Impact Specialist	+++++*****																0.28	0.28	
27 V. Joshi	Impact Specialist	+++++*****																0.28	0.28	

